# Sweet Fifteen:

# The Competition on the EU Sugar Markets

Swedish Competition Authority Report 2002:7

Swedish Competition Authority December 2002
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ISSN-nr 1401-8438

# 1 Foreword

In June 2001 the European Union Agricultural Council decided on a new Common organisation of the markets in the sugar sector (CMO Sugar). At the beginning of 2003, the EU Commission will present a report, accompanied by appropriate proposals for the reform of this market. Prior to the mid-term evaluation of the Common Agricultural Policy, the Swedish Ministry of Agriculture Food and Fisheries has been gathering background information regarding the competition situation on the EU sugar markets.

In May 2002, The Swedish Competition Authority was commissioned to conduct a survey and to analyse structural problems within the EU sugar trade. The report aimed to cover the competition situation on the EU sugar markets from certain aspects. These aspects were defined as follows:

- show the incentives for beet growers/sugar producers to compete and/or to influence the design of the regulatory system,

- present examples of the market situation with regard to industrial buyers of sugar and sugar consumers, and to

- map out how the present regulatory system affects the markets for alternative sweeteners, potential competition and product development within the sugar sector.

The work has not aimed at presenting proposals, rather the analysis ends up with a number of conclusions that should be taken into account when the mid-term evaluation of the Common Agricultural Policy is conducted.

The work has been carried out by a project group, consisting of Christian Blume (project leader), Niklas Strand and Erika Färnstrand.

Stockholm December 2002

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# 2 Summary

*CMO Sugar*

The common organisation of the markets in the sugar sector (CMO Sugar) is one of the components of the Common Agricultural Policy (CAP) of the European Union. The CAP was put in place in 1962, and the CMO Sugar has been in place since 1967. While most of the regulations regarding other products covered by the CAP have been subject to reforms over the years, CMO Sugar has remained almost intact since it came into force.

The EC Treaty contains both rules for the safeguarding of competition on the different EU markets, and rules establishing and governing production and trade in the agricultural sector. When a market is covered by the Common Agricultural Policy, EC competition rules do not necessarily apply to anti-competitive agreements between undertakings. The intervention price and quota system under CMO Sugar has in principle such anti-competitive features which since they are incorporated into the CMO Sugar cannot be tackled by either national or competition law in the EU.

The main objectives of the CAP are to increase productivity, ensure a fair living standard for the agricultural society, stabilize markets, ensure the availability of supplies and that supplies reach consumers at reasonable prices.

The CMO Sugar is designed to pursue the five objectives of the CAP and contains the following main supportive elements.

- ***institutional support prices***, such as *the intervention price*, *the basic beet price* and *the minimum beet price*. These support prices guarantee a certain level of income for the sugar beet growers and for the sugar producing industry;

- ***intervention purchases***, either by the Member States' intervention agencies, or by the EU Commission;

- ***production quotas and levies***, regulating both the total EU quantity of sugar production and the quantity of sugar production in each sugar producing Member State;

- ***export refunds***, safeguarding that sugar producers/exporters receive a guaranteed price for exported sugar if the world market sugar price is lower than the Community intervention price;

- ***import duties and preferential imports***, safeguards on the one hand that the price for imported sugar is not lower than the Community sugar price, and on the other hand that sugar import from certain countries receive a preferential status. It also provides for "special preferential" treatment in relation to some countries.

- ***production refunds for the chemical and pharmaceutical industries***, compensating these industries for the high sugar prices in their competition with such industries outside the European Union;

*The markets*

When investigating a specific competition situation, it is common practice to reason in terms of the relevant market. This includes both the relevant product and geographical market. By the market definition the boundaries of competition between firms can be identified and defined. It also makes it possible to calculate market shares for the purpose of assessing dominance when it comes to the unilateral conduct of one or several firms acting in an abusive manner, or for the purpose of coming to terms with anti-competitive agreements between firms.

The definition of the market is essentially a matter of substitutability. Where goods or services for a particular purchaser can be regarded as substitutable, by reason of the products' physical characteristics, their prices and their intended use, they are defined as being within the same product market. The relevant geographical market is defined as the area in which the undertakings concerned are involved in the supply and demand of products or services, where the conditions of competition are sufficiently homogenous and can be distinguished from neighbouring areas because they are appreciably different.

The relevant market for assessing a given competition issue is thus established by the combination of the product and geographical markets.

*The product markets*

The different categories of sweeteners can be divided into *natural sweeteners* consisting of sugar and sugar-like products (such as High Fructose Syrups (HFS, isoglucose) and inuline syrup), *polyols* e.g. Sorbitol, and *high-intensity sweeteners* (HIS), e.g. Aspartame. Only the natural sweeteners are covered by the protective and supportive system of the CMO Sugar.

Sugar is the conventional name for sucrose, which is extracted from sugar beet or from sugar cane. Chemically, both types of sugars are identical and consist of 99.9 per cent sucrose. The largest sugar cane producers are India, Brazil, China and Mexico and the largest sugar beet producers are the EU, the USA, Turkey and Poland.

Sugar from sugar cane constitutes about 70 per cent of total world sugar production, and sugar from sugar beet 30 per cent. Natural sweeteners are produced from maize, starch potato, wheat or rice starch. Most natural sweeteners have similar sweetness, caloric value and bulk characteristics as sugar.

This report focuses on sugar for industrial use where the only viable substitute for sugar is HFS, and then only in certain industries, such as the soft drinks industry. However, since HFS is regulated by a quota, it is at present not possible to substitute sugar by HFS. Other sweeteners have either differing functional properties or cannot be economically substituted for sugar.

Sugar can be divided into three product categories: white granulated sugar, liquid sugars and specialty sugars. Industrial users of sugar are the food processing industry, and the chemical and pharmaceutical industry. 70 per cent of total human consumption of sugar in the EU originates from sugar incorporated in food and drinks, and 30 per cent is direct consumption of pure sugar by households.

*The geographical market*

The relevant geographical market is the area in which the firms are involved in the supply and demand of products and where the con-

ditions of competition are sufficiently homogenous and separated from neighbouring areas. For instance, for a daily newspaper the relevant geographical market may be a city, but for a manufacturer of large aircraft it is global.

Sugar trade between Member States is small. The fact that firms active on a market have successfully managed to geographically separate the market (market-sharing) is not to be misinterpreted as meaning that the geographical market is as small as the separated parts of the market.

An example of where a national market has been geographically separated by firms is Germany. According to the EU Commission (M.2530 Südzucker/SLS (2001)) Germany exhibits a geographical division with little interaction between the North and the South of Germany.

Were it not for the CMO it cannot be excluded that the EU would constitute one market for sugar or even that the European Union would be part of a market larger than the Union.

*Beet Growers*

Sugar beet growing accounts for some 45 000 full-time equivalent agricultural jobs. Fewer than 300 000 (four per cent) of the EU's seven million farms grow sugar beets. The sugar processing industry employs 52 000 people although most of these jobs are only seasonal. The largest sugar producing Member States are France, Germany and Italy. These Member States together account for more than 60 per cent of EU’s total sugar production quota of 14 482 142.5 tonnes white sugar.

After beet has been harvested, its sugar content tends to decrease over time. This is why sugar processing plants are always located in the beet-growing regions. In general, beet is grown at the very most 200 kilometres from the sugar processing plant in which it is processed.

Beet yields vary considerably among sugar producing Member States. The beet yield varies between 4 tonnes/hectare in the south of Spain to 12 tonnes/hectare in France.

On the basis of the production quotas allocated to each Member State and the sugar processors within the Member States, the processors in turn provide "beet delivery rights" to individual growers that supply sugar beets.

The CMO Sugar sets up the relationship between the beet grower and the sugar processor and establishes the use of inter-trade agreements, which contain provisions regarding purchase price, quantity, quality, delivery periods, payment schedules etc.

*Sugar processors*

There is a fixed cost involved in setting up a plant for processing sugar, the size of the fixed cost is comparable to that involved in the beer, tobacco, petroleum or steel industries (OECD (1998)). The sugar processing industry is highly concentrated on all EU markets. In seven of fourteen sugar producing Member States, only one producer holds the entire sugar production quota. In the other Member States the industry is also highly concentrated with only a few large firms.

In addition to the concentrated markets, there is also some cross-ownership between sugar firms within the Union, e.g. Südzucker (Germany) owns 50 per cent of Agrana (Austria) and 13.5 percent of Azucarera Ebro (Spain).

*Economics of sugar*

Under the CMO Sugar, prices can move over a range between the subsidised export price, approx. €67, and the price of imports, approx. €75 depending on the world market price. Under perfect competition, prices would be driven down to the export price plus applicable transport costs. If firms within the Union set prices above world market price plus tariffs, imports could easily substitute for domestically produced sugar. The market prices for the spring of 2001 vary between €71.7 and €78.6, the average for the whole of the EU is €74.6.

Transport costs are not enough to explain the difference between observed prices and what prices would be under competition.

Firms in the sugar market are able to charge higher prices through so-called tacit collusion. The most important feature of tacit collu-

sion is that firms can succeed in charging a price that far exceeds marginal cost, as long as other firms in the market do the same. Tacit collusion need not involve any explicit communication between the firms.

Tacit collusion poses a problem for competition authorities since it arises in markets in which there are only a few operators who, by virtue of the characteristics of the market, are able to behave in a parallel manner and derive benefits from their collective market power without necessarily infringing the EU or national competition regulations. The rules prohibiting anti-competitive agreements require concerted practices or explicit agreements which are not always present under tacit collusion.

The CMO Sugar has increased firms' ability to sustain tacit collusion in a number of ways. Regulation has blocked non-preferential imports from outside the Union and has prevented both entry of new firms, and the competing product isoglucose, by assigning quotas to incumbent firms.

By assigning fixed production quotas on a national level, the CMO Sugar has consolidated national markets, which has helped firms to separate markets geographically.

In order for tacit collusion to be sustainable, there must be a credible retaliatory mechanism. By subsidising excess production and exports, the CMO Sugar provides a retaliatory mechanism enabling firms to use the threat of shifting quantities from exports to sales within the Union.

The substantial cost to the consumer of the CMO sugar has prompted calls for reform. In our discussion of reform alternatives we find that only lowered import tariffs would *both* reduce the incentives for tacit collusion *and* if tacit collusion prevails, reduce market price. A reduction in the intervention price or the export subsidies would *increase* firms' ability to sustain collusion while having no effect on the collusive market price.

# 3 Aspects of EC Law

The EC Treaty[1] contains both rules for the safeguarding of competition on the different markets in the European Union and rules establishing and governing production and trade in the agricultural sector. The purpose of this chapter is to briefly present the EC competition rules as these are stated in the EC Treaty and to give a short description as to how these rules relate to those of the European Union's Common Agricultural Policy (CAP).

## 3.1 Competition vs. Agriculture in the EC Treaty

### *Competition in the EC Treaty*

The basis of EC competition law is contained in Chapter I of Part III of the EC Treaty. This chapter consists of Articles 81 to 89. For the purpose of this report Articles 81 and 82 are of particular interest. These Articles are directly applicable and have direct effects in the Member States. Only the Commission can – in specific cases – provide exemption from the competition rules within the Community.

Article 81(1) prohibits agreements between undertakings,[2] decisions by associations of undertakings and concerted practices between undertakings that restrict competition within the common market. For example, it is prohibited to fix purchase or selling prices; limit or control production, markets, technical development, or investment; share markets or sources of supply. This prohibition may be declared inapplicable in the case of agreements that satisfy the conditions in Article 81(3). Such conditions may concern improvements in the production or distribution of goods or the promotion of technical or economic progress, while allowing customers a fair share of the resulting benefit.

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1 For practical reasons, all references will be made in accordance with the nomenclature of articles established through the present (December, 2002) consolidated version of the EC Treaty.

2 The term undertakings refers to firms in a broad sense.

Article 81(1) can be used against anti-competitive agreements between undertakings acting in any market covered by the Treaty. It is in principle also applicable to anti-competitive agreements between undertakings on agricultural markets. We will discuss the application of Article 81 to markets covered by the CAP and the Common Market Organisation for Sugar (CMO Sugar).

Whereas Article 81 is concerned with agreements, decisions and concerted practices between undertakings which are harmful to competition, Article 82 prohibits the unilateral conduct of one or several dominant firms which act in an abusive manner, such as imposing unfair prices or unfair trading conditions or limiting production or markets. Unlike Article 81(1), which can be declared inapplicable through 81(3), *there are no exceptions to Article 82*. The crucial issue when it comes to applying Article 82 in a specific case is to determine whether the undertaking or undertakings involved is/are actually occupying a dominant position, given the specific market conditions for the specific product. This assessment depends, among other things, upon the definition of the so-called relevant product market and relevant geographical market.

### *Agriculture in the EC Treaty*

The basis of EU agriculture policy is contained in Title II of Part III of the EU Treaty. This chapter consists of Articles 32 to 38.

The *raison d'être* of the entire CAP is given in Article 33(1), where the five objectives of the CAP are expressly stated. These are:

- *to increase agricultural productivity by promoting technical progress and by ensuring the rational development of agricultural production and the optimum utilization of the factors of production, in particular labour;*

- *thus to ensure a fair standard of living for the agricultural community, in particular by increasing the individual earnings of persons engaged in agriculture;*

- *to stabilize markets;*

- *to assure the availability of supplies;*

- *to ensure that supplies reach consumers at reasonable prices.*

Article 32(1) provides both that the common market – in this case the EC competition rules – shall extend to agriculture and trade in agricultural products and that, under certain conditions (provided in Articles 33-38) exemptions from these rules for certain products, e.g. sugar, are possible.

### *The relationship between competition law and agricultural policy*

Despite the fact that Article 32(1) provides for the extension of the competition rules to the agricultural sector, Article 36 provides that the competition rules of the Treaty shall apply to agricultural products *only* to the extent determined by the Council, *account being taken of the objectives set out in Article 33*. The objectives of the CAP may therefore to some extent override the common market competition rules. The application of this principle has been manifested by the European Court of Justice, the ECJ.[3] The only product markets where this may be applied are those products listed in Annex I to the Treaty.[4] If a product is not mentioned in Annex I, it cannot benefit from the derogation in Article 36 no matter how closely it seems to be related to those products.

Through Council Regulation 26/62[5] the Council of Ministers of Agriculture has established as a principle that both Articles 81 and 82 are fully applicable in the agricultural sector. Article 2 of that regulation, however, exempts certain types of agreements in the agricultural sector from the application of Article 81(1), namely agreements which form *an integral part of a national market organisation or are necessary for attainment of the objectives of the CAP*.[6] Since this means that derogations relate only to the applic a-

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[3] See case 139/79 *Maizena* [1980] ECR 3393, para 23-24.

[4] The products listed in Annex I are divided into chapters. Chapter 17 of this list contains sugar-related products such as beet sugar, cane sugar, sugar syrups, caramel and molasses.

[5] Council Regulation No 26 applying certain rules of competition to production of and trade in agricultural products. OJ [1959-62] p 129.

[6] It continues: "In particular, it shall not apply to agreements, decisions and practices of farmers, farmers' organisations, or associations of such associations belonging to a single Member State which concern the production or sale of agricultural products or the use of joint facilities for the storage, treatment or processing of agricultural products, and under which there is no obligation to charge identical prices, unless the Commission finds that

tion of Article 81, there can be no derogation of Article 82 to the agricultural sector. This in turn means that there can never be a derogation for the abuse of a dominant position.

*National market organisations*

Article 2(1) of Regulation 26/62 provides that Article 81 shall not apply to agreements which form *an integral part of a national market organisation.* The term "national market organisation" refers to a system of rules on a national level organising and regulating the production and marketing of a certain agricultural product,[7] but there is no legal definition of a national market organisation. This term has been defined by the ECJ.[8] By 1967, the Council had already established common organisations for most agricultural products referred to in Annex 1. Since, therefore, the majority of national marketing organisations have ceased to exist, the EU Commission in order to strengthen common market organisations has found that the "national market organisation defence"[9] in competition cases regarding such products, is not applicable.[10]

*Common market organisations*

Article 2(1) of Regulation 26/62 also permits agreements which are necessary for the attainment of the objectives of *the common agricultural policy, CAP*.[11] In order for anti-competitive agreements in the agricultural sector to come within the CAP-derogation, it is necessary to satisfy and advance *all five objectives* of Article 33.[12] In practice it is likely that if a *common market organisation* is established, the EU Commission and the Community Courts will hold

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competition is thereby excluded or that the objectives of Article 39 of the Treaty are jeopardised."

7 It must be defined in a way that would be consistent with the objectives of a common organisation under the second exception of Article 2(1) of Regulation 26/62. Thus, the objectives of the common agricultural policy, contained in Article 33 EC, were read into the first exception of Article 2(1). See *New Potatoes*, OJ [1988] L 59/25, [1988] 4 CMLR 790.

8 See case 48/74 *Charmasson* [1974] ECR 1383, paras 21-36.

9 Attempts to exempt an agreement that otherwise would fall under Article 81 by claiming that it would constitute a part of a national market organisation.

10 *Scottish Salmon Board* , OJ [1992] L 246/37, [1993] 5 CMLR 602.

11 See Article 33(1).

12 Case 71/74, *FRUBO v Commission* [1975] ECR 563, [1975] 2 CMLR 123. See further Whish (2001).

that the objectives of Article 33 are already fulfilled. The result being that any additional agreements outside the common market organisation will not fall within the CAP-derogation in Article 2(1) of Regulation 26/62, and are thus eligible for scrutiny in accordance with EC competition law.

Article 2(2) of Regulation 26/62 confers sole power to the EU Commission to determine the applicability of Article 2(1), subject to review by the Community Courts. However, the ECJ has held that it is possible for a national court to apply Article 81(1) to agreements where it is clear that the EU Commission would not permit derogation pursuant to Regulation 26/62.[13]

### *Conclusion*

A conclusion as to the relationship between agriculture and competition in the EC Treaty is that the rules of competition in the EC Treaty are also applicable in the agricultural sector. This means that anti-competitive agreements between undertakings and cases concerning abuse of a dominant position are eligible to fall under the scrutiny of the EU institutions.

However, if there exists either a national or a common market organisation, established and functioning under the conditions of the five objectives of the CAP, as expressed in Article 33, it will lead to restrictions of competition, which if they are direct and envisaged effects of the market organisation, often will not be possible to prohibit by competition legislation.

This means in short that the five objectives of the CAP, expressed in Article 33 of the EC Treaty are not necessarily consistent with the normal forces of competition. Thus, the intervention price, a cornerstone of the CMO Sugar, is in effect a price-fixing agreement but cannot be contested by the competition authorities. Additional agreements between individual firms in order to restrict competition may, however, be infringements of competition law.

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[13] Cases C-319/93 etc *Dijkstra v Friesland Coöperatie* [1995] ECR I-4471, [1996] 5 CMLR 178, paras 25-36; Case C-399/93 *Oude Luttikhuis c Coberco* [1995] ECR I-4515, [1996] 5 CMLR 178, para 30.

## 3.2 Council Regulation 1260/2001: Organisation of the Common Market for Sugar[14]

*History of the Common Market Organisation for Sugar*

The CMO Sugar is one of the components of the CAP. The CAP was put in place in 1962, and the CMO Sugar became effective in 1967. The CMO Sugar is designed to pursue the five objectives of the CAP as these are defined in Article 33 (1) of the EC Treaty.

*Structure of the basic sugar regulation*

The current basic sugar regulation contains the following main supportive elements.

- ***institutional support prices***, such as *the intervention price*, *the basic beet price* and *the minimum beet price.* These support prices guarantee a certain level of income for the sugar beet growers and for the sugar producing industry;

- ***intervention purchases***, either by the Member States' intervention agencies, or by the EU Commission;

- ***production quotas and levies***, regulating both the total EU quantity of sugar production and the quantity of sugar production in each sugar producing Member State;

- ***export refunds***, safeguarding that sugar producers/exporters receive a guaranteed price for exported sugar if the world market sugar price is lower than the Community intervention price;

- ***import duties and preferential imports***, safeguards on the one hand that the price for imported sugar is not lower than the Community sugar price, and on the other hand that sugar im-

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[14] Council Regulation (EC) No 1260/2001 of 19 June 2001 on the common organisation of the markets in the sugar sector, the so-called "*basic regulation*". The references for this chapter have mainly been Chapter 12 of CAP MONITOR (Agra Europe Ltd), London, 2002, the report Evaluation of the Common Market Organisation of the Markets in the Sugar Sector, NEI, Rotterdam, 2000, the Swedish Marknadsöversikt vegetabilier (Jordbruksverket) 2001.

ports from certain countries receive a preferential status (mainly former French or British colonies). It also provides for "special preferential" treatment of sugar imports from India and from 2006 also from the world's 48 least developed countries (LDC);

- ***production refunds for the chemical and pharmaceutical industries***, compensating these industries for the high sugar prices in their competition with such industries outside the European Union.

Each sugar producing Member State has a national Paying Agency and an Intervention Agency, which organise the collection of production levies, payment of export refunds, and which are prepared and obliged to purchase sugar from sugar producers at the minimum guaranteed price, the intervention price. The Paying Agencies have a current account with the EC to clear the differences between collected levies and paid refunds.

The latest intervention purchase by an intervention agency was in the marketing year 1986/87, when the German Intervention Agency bought 15,703 tons of white sugar (NEI (2000)).

In addition to sugar, sugar beet, sugar cane, molasses, maple sugar and maple syrup, artificial honey and beet pulp, the current basic regulation[15] also covers the sweeteners isoglucose and inulin syrup. These products were included in the CMO Sugar in 1980 and 1994 respectively, because both can, to some extent, be used as substitutes for sugar. Isoglucose and inulin syrup are subject to production quotas and production levies, and are eligible for export refunds. The total quota for isoglucose and inulin syrup corresponds to 2.1 per cent and 2.2 per cent respectively of the total sugar quota.[16] However, the EU is not committed to buy either isoglucose or inulin syrup, and thus does not determine any intervention prices for these products.

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[15] Covering the seventh quota-setting period since the start of the CMO Sugar in 1967, i.e. 2001/02 to 2005/06.

[16] Which amounts to 300 725.2 tonnes (dry matter) for isoglucose and 320 691.0 tonnes (white sugar equivalent/isoglucose) for inulin syrup. The total sugar production quota amounted to 14 482 142.5 tonnes in 2001.

### *Institutional support prices*

The price system for the sugar regime uses three institutional support prices. These are the *basic beet price*, the *minimum beet price* and the *intervention price*. These have been fixed for the five-year period 2001/02 to 2005/06. They apply for sugar marketing years, from July 1 to June 30.

#### *The basic beet price*

In order to guarantee that beet growers' income complies with the CAP, the Union fixes a basic beet price. For 2001/02 to 2005/06 the basic beet price is €47.67/tonne beet of standard quality, as defined in the basic regulation.

#### *Minimum beet prices*

The minimum beet price is the basic beet price minus 58% of the production levies. The minimum beet price is that which *"sugar manufacturers buying beet (a) suitable for processing into sugar and (b) intended for processing into sugar, shall be required to pay..."* For 2001/02 to 2005/06 the minimum beet price for A-beet is €46.72 per tonne of beet, and for B-beet it is €32.42/tonne.

The minimum beet prices apply at beet collection centres with transport costs from there to the processing plant paid by the processor. As has been mentioned earlier, no minimum beet price is set for C-beet – that is beet producing C-sugar – as such sugar, and hence the beet from which it is produced, is not eligible for Union price support.

The price paid for C-beet is determined by the return beet processors obtain from selling the resulting C-sugar on the world market. Although the CMO Sugar does not prescribe how much growers should be paid for C-sugar beets, it is generally agreed in the inter-trade agreements that beet growers receive about 60 per cent of exporting sugar processors' receipts for C-sugar. Usually beet growers get paid for the C-sugar beets at the end of the marketing season, when all C-sugar has been exported.

*The intervention price*

In case of intervention purchase, as sugar beet is not storable, an intervention price is set for *the processed product* (white sugar) on the basis that sugar beet processors receive this support in return for being required by law, to pay at least the minimum beet price to beet growers.

The white sugar intervention price is calculated from the basic beet price by adding a sugar processing margin and the costs of delivering beet to processors and subtracting sugar processor's receipts from sales of molasses.[17]

The basic beet price refers to sugar beet with 16 per cent sugar content. Using the conversion rate 130 kg white sugar/1,000 kg beet, the white sugar intervention price can be derived as 63.19 Euro/100 kg sugar.

Table 3.1: The Components of the Intervention Price

| | **€/100kg white sugar** | **€/100kg beet** |
|---|---|---|
| Intervention price, white sugar | 63.19 | |
| Transport cost of beet | -4.41 | |
| Processing cost | -24.36 | |
| Value of molasses for beet growers | +2.25 | |
| White sugar price in beets (Price paid to beet grower) | 36.67 | 4.767 |
| A-minimum beet price (98 per cent of basic price) | | 4.662 |
| B-minimum beet price (min. 60.5 per cent of basic beet price) | | 2.884 |

Consequently, growers receive 58 per cent of the intervention price (36.67/63.19), while processors receive 42 per cent.

The intervention price is the price at which the Community is committed to buy sugar, if it is offered to the national Intervention Agencies.

[17] Molasses is a residual substance from sugar manufacturing, mainly used as foodstuff for livestock.

The common white sugar intervention price applies for bulk white sugar of standard quality in so-called "non-deficit areas", unpacked, ex-factory loaded, f.o.b. purchaser's means of transport. For 2001/02 to 2005/06, it is €63.19/100 kg white sugar. The intervention price is increased in those Member States that are regarded as being in deficit, where consumption is larger than production, due to adverse production conditions. At present, Ireland, Portugal, Spain, Finland and the UK are regarded as deficit regions. The premium is intended to reflect the costs of transport from the nearest sugar surplus region in the Community to the deficit region in question. The beet price is increased correspondingly, leaving the processing margin unchanged. The objective of the regional premium is to increase beet growing by ensuring that at least a part of the price increases in deficit regions will accrue to the growers. For 2001/2002, the following regional premiums apply:

| | |
|---|---|
| Finland, Portugal, Ireland and the UK: | 2.31 per cent of the intervention price |
| Spain: | 2.67 per cent of the intervention price |

From the common white sugar intervention price, an equivalent intervention price is derived for raw sugar of a standard quality.[18]

*Production quotas and levies*

All production of sugar, isoglucose and inulin syrup in the European Union is allocated to Member States by production quotas, and only quota sugar can be sold within the EU. Thus the quota system limits the supply of sugar on the EU sugar market. The Member States' national production quotas of sugar consist of A- and B-quotas. The A- and B-quotas differ by quantity and the production levy charged. The production quantity above the A- and B-

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[18] This price is calculated by deducting a processing margin and adjusting for the weight loss between raws and whites. The raw sugar intervention price applies at a common level throughout the Union and for 2001/02 to 2005/06, it is €52.37/100kg less regional premiums, and it has not been changed since 1985. Since 1991/92, sugar prices in the EU have always been higher than the intervention price, and during this time period no intervention purchases have taken place. There is no regionalisation of raw sugar intervention price.

quotas is called the C-sugar, which is not supported under the system. C-sugar has to be sold on the world market without the support of export refunds, i.e. at the world market price.[19]

Production quotas are based on historical production levels and the Commission has emphasised that they are not based on consumption levels.

The EU has allocated the production quotas to all Member States, except for Luxembourg, and each Member State then allocates the national quota to individual sugar producers in the Member State. The allocation can be changed on a yearly basis, but in practice – in most Member States – the allocations change only in the event of closure or mergers between sugar processors. On the basis of the quota allocated to the sugar processors, the processors in turn give "beet delivery rights" to individual growers that supply sugar beets. This is done through the use of so called inter-trade agreements,[20] a framework prescribed by the CMO Sugar for the contracts between beet growers and sugar processors – which contain provisions regarding the purchase price, quantity, quality, delivery periods, payment schedules etc.

The sugar production quotas allocated may be transferred between firms within Member States, but *not between Member States.* There is a restriction on quota transfers between firms within a Member State, as no individual firm's quota may be reduced by more than 10% from one year to another.[21] The restriction does not apply where quotas are transferred as a result of mergers or transfers between plants, or plant closures. There is no legal restriction on intra-community trade in sugar beet and sugar. [22]

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[19] The current production quotas are presented in Appendix 2.

[20] Formally, the term in the basic Regulation is "agreements within the trade", but for practical reasons the term "inter-trade agreements" will be used.

[21] In Italy, Spain and the French overseas territories (the DOM) this restriction does not apply "where quotas are transferred under restructuring plans in the beet, cane and sugar sectors in the region concerned and to the extent necessary to permit such plans to be implemented".

[22] In the case of intra-community trade in sugar beets, see Sugar Beet, OJ [1990] L 31/32, [1991] 4 CMLR 629, where an inter-trade agreement could not prevent cross-border trade in sugar beets between France and Belgium.

The last major revision in levels of national production quotas for both sugar and isoglucose were the quota review held in 1980/81.[23] At all subsequent reviews, the decision has been to keep quota levels constant. As new Member States have joined the Community, they have been assigned production quotas roughly corresponding to their production of sugar at the time of accession.

The quotas for the period 2001/02 to 2005/06 are 0.8% smaller than before as a result of the decision by the Council of Ministers of Agriculture in July 2001 to permanently reduce the structural surplus by 115 000 tons (sugar, isoglucose and inulin syrup). This reduction shall be *applied proportionally* to all Member States' national quotas.[24] The reduction was made to comply with the 1994 Agreements on Agriculture of the Uruguay Round of the GATT (URAA) negotiations,[25] which established maximum quantities of sugar to be exported with export refunds and maximum amounts of export refunds. Although in the current period (2001-2006) the production quotas are set for five years, there is provision to adjust the amount of sugar that may be exported with refunds if maximum quantities are reached.

The ratio of B/A quotas differs between Member States, since in the early seventies, Member States with a comparative advantage in sugar production were assigned a relatively high B-quota to allow them to expand their sugar production. As a result, France, Belgium, the Netherlands, Germany, Denmark and Austria have high B/A quota ratios.

A sugar producer may carry forward a certain quantity of B-quota or C-sugar to the next year. However, this quantity may not exceed 20 per cent of his A-quota. On condition that this sugar is stored for at least 12 months, it then becomes a part of that year's A-quota. The carry forward facility allows producers to smooth out the effects of good and poor harvests and to make optimum use of their production quotas.

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23 Portugal's sugar quota was raised in 1996.

24 DG Agri Newsletter no 35, 2001 and Newsletter no 27. 2000

25 New negotiations have been initiated in Doha, Quatar, in November 2001.

The CMO Sugar requires sugar beet growers and sugar producers to pay production levies, collected by the Member States' national Intervention and Paying Agencies in order to cover the costs of export refunds on quota sugar exported to the world market.

The CMO Sugar also pays out refunds for the use of sugar in production, to a subset of industrial buyers of sugar in the EU; the chemical and pharmaceutical industries.

There are 3 production levies:

- A basic levy of 2 per cent of the intervention price on A- and B-quota sugar.

- A variable levy on B-quota sugar, with a maximum level of 37.5 per cent of the intervention price, determined by the total costs of the export refunds.

- An additional levy, expressed as a percentage of the first two levies, collected in the event that income from the other two are not sufficient to cover the costs of the export and production refunds.

The levies are paid by the individual sugar producing firm, which in turn passes on a part of the levies to beet growers through a reduction in the basic beet price. The CMO Sugar prescribes that sugar processors must pay a minimum beet price to beet growers, which is defined as the basic beet price minus 58 per cent of the production levies.

The different level of production levies for A- and B-quota sugar means that beet growers receive different prices for A- and B-quota beets. There is a possibility to decide on a mixed price through the inter-trade agreements. Such an option would have to be approved by the Intervention Agency of the Member State in question. An exception to this effect has been made for Belgium and the Netherlands, where a mixed price for beet is used.

### *Export refunds*

Exported sugar produced under the A- or B-quota is eligible for export refunds, also called *restitutions*. In addition, a quantity cor-

responding to the imports of so-called "preferential sugar"[26] can be exported with refunds. Export licenses and refunds are determined by the Sugar Management Committee of the EU.

Export refunds for sugar take two forms:

- First, there is a series of weekly export tenders each season where traders (and some processors) bid for the minimum level of refunds they need in order to be able to compete on the world market. It is through these tenders that the great bulk of EU sugar exports are made;

- Second, there is a standing export refund for sugar which is meant to apply to the export of small quantities. The level of the restitution is equal to the lowest tender minus €3 and is set fortnightly.

The maximum export refund is equal to the white sugar intervention price plus "f.o.b. costs" minus the world market price. The "f.o.b. costs" are approx. €5. The sum of export refunds and world market price thus gives the producer close to €67/100kg exported sugar.

### *Import duties and preferential imports*

As a result of the URAA, variable import duties were replaced by fixed import tariffs, which had to be reduced by 20 per cent in comparison to the average import duty during the period 1986-1988. The reductions took place over the years 1995/96-2000/01, which corresponded to a tariff reduction of about 3 per cent per year.

There is a special safeguard clause in the agreement, under which the EU may charge an additional import duty in two instances: if the import volume exceeds a trigger level or if the world market price falls below the trigger price €53.10/100kg.

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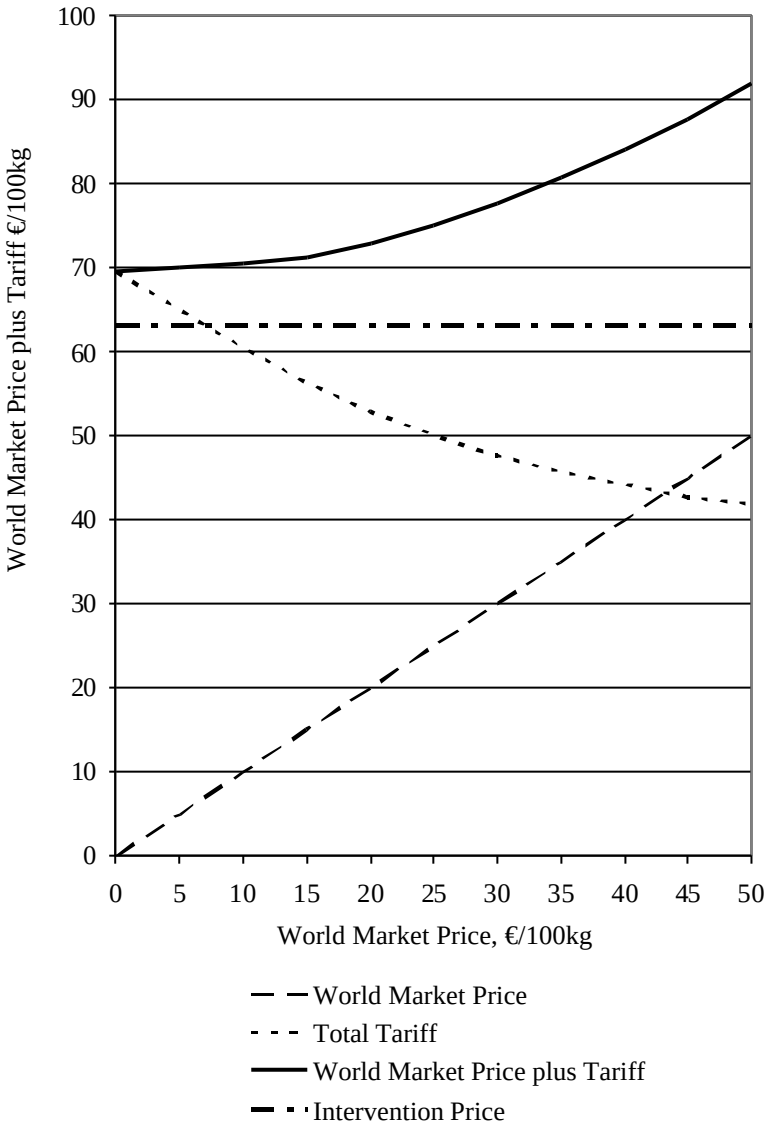
[26] That is imported sugar which is exempted from import duties from the African, Caribbean and Pacific countries (ACP) and India.

Figure. 3.1: The EU Tariff Structure




The world market price for sugar has been such that the safeguard clause has been in force since 1995. For example, if the world market price is €25 the variable tariff will be €8.21 in addition to the fixed tariff of €41.9 which results in an import price of €75.11. The fixed tariff in combination with the additional import duty has re-

duced non-preferential imports to a minimum. According to the Swedish Ministry of Agriculture, Food and Fisheries, average annual imports of pure sugar at full import duty have been 28 000 tons, compared to annual EU consumption of 12.7 million tonnes. This equals 0.22 per cent of consumption and 0.19 per cent of the maximum EU sugar production quota.

### *Preferential sugar*

In accordance with the Preferential Sugar Agreement, the EU guarantees to buy, annually and for an indefinite time period, 1,304,700 tons of sugar in white sugar equivalents (w.s.e.) from ACP countries and India.[27] The preferential sugar imports are exempted from import duties. The sugar price is negotiated annually between the EU and the ACP countries. In practice it has always been equivalent to the derived intervention price for raw sugar in the UK. The intervention purchase option also applies to ACP preferential sugar, were it to be offered to intervention by an ACP State. If an ACP State's quota is not filled entirely (for reasons other than force-majeure) the quota for the country in question shall be reduced in respect of each subsequent delivery period by the undelivered quantity. Preferential sugar, once admitted, is in "free circulation" within the EU. It is eligible for refunds on its export to third countries on the same conditions as beet and cane sugar produced in the EU.

### *Special preferential sugar*

In case the quantities of sugar available through preferential imports and maximum supply needs (see below) are insufficient, which is determined by the exports from the French overseas territories, additional cane sugar can be imported from the ACP countries and India. This quantity is called special preferential sugar (SPS) and amounts to approx. 300,000 tonnes.

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[27] This agreement was reached when the United Kingdom joined the EC in 1973, as the country already had large imports of cane sugar from its former colonies among the ACP countries. These imports became a part of the CMO Sugar, and later India also became a duty free exporter to the EU.

The European Union agreed, from February 2001 to give duty-free and quota-free entry for all exports into the EU, except for arms (known as the Everything but Arms-initiative (EBA)) from the 48 least developed countries in the world (LDC) and India.

From July 1, 2001, an import quota of 74,185 tonnes *raw* sugar free of duty, was established for the LDC. Until 2009 this quota is to be increased by 15 per cent annually.

It has been decided that *all* sugar imports from the LDC will be subject to a *gradual reduction* in duties, starting in 2006/07 (respectively 20 per cent, 50 per cent and 80 per cent annually). The duties are to be completely abolished by July 1, 2009.

### *Special national aid*

When the CMO Sugar was established, Italy was granted permission to subsidise its sugar sector because of poor soil and an inefficient farm structure. For the period 2001/02 to 2005/06 the maximum authorised aid in southern Italy has been set at €5.43/100 kg w.s.e. Mainland Portugal has been granted a similar permission and the maximum authorised aid to Portuguese sugar beet growers is €3.11/100 kg w.s.e. Spanish sugar cane producers have been granted maximum €7.25/100 kg w.s.e.

### *Maximum Supply Needs*

From July 1, 1995, supply quotas have been set for each of the four Member States having a refining industry for raw cane sugar.[28] These quotas, Maximum Supply Needs, represent their annual requirements. At the time of their accession to the EU, both Portugal and Finland had substantial imports of raw cane sugar, and the British sugar refining industry requested permission to import more raw cane sugar than was permitted by the preferential imports agreement. To comply with all demands for import of raw cane sugar, the EU established maximum import levels for individual

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[28] These are: Finland (59 925 tonnes w.s.e.), Metropolitan France (296 627 tonnes w.s.e.), Mainland Portugal (291 633 tonnes w.s.e.) and the UK (1 128 581 tonnes w.s.e.). EU-15 total: 1 776 766 tonnes w.s.e.

refineries in the EC. If imports exceed these levels, a penalty will be imposed. The maximum supply needs are met by imports from the ACP, LDC, and the French overseas territories (DOM).[29]

### *Production and export refunds for sugar using industries*

The chemical and pharmaceutical industries within the Community qualify for a production refund when using sugar, isoglucose or glucose in production. The purpose of this refund is to compensate for their disadvantage in terms of higher input sugar prices relative to producers outside the Community. The production refund level is fixed quarterly at a level equal to the average of the export refunds for a defined reference period minus €8.45/100 kg w.s.e.

The export refund is fixed monthly and applies to sugar exported in processed products. This refund is fixed as a unit rate times the sugar content of the products. Food, drinks and other products containing sugar also qualify for export refunds. These refunds are fixed monthly at a level corresponding to the export refund for white sugar minus €3/100 kg w.s.e. based on the sugar content of the product.

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[29] *Départements outre-mer*, the French overseas territories, consisting of the islands of Guadeloupe, Martinique and Reunion.

# 4 The EU Sweetener Market

## 4.1 General Background

From a competition point of view, it is common practice to reason in terms of the relevant product market as well as the relevant geographical market. After a brief presentation of the Commission's definition of relevant market for the purposes of Community competition law, we will discuss the relevant product market, and later we will continue the discussion by drawing some conclusions as to the relevant geographical market for [different] sweetener products.

### *The definition of the relevant market for the purposes of Community competition law*[30]

In order to be able to decide in a specific case what competition effect a given co-operation, merger or other such action of an undertaking may have, it is necessary to have a framework against which the situation may be assessed. This is done using the concept of relevant product and geographical market.

Market definition is a tool to identify and define the boundaries of competition between firms. It enables a framework to be established within which competition policy is applied by the EU Commission.

The objective of defining a market in both its product and geographic dimension when the competition authorities are examining competition cases is to identify the actual competitors of the undertakings involved that are capable of constraining incumbents' behaviour and preventing them from behaving independently of effective competitive pressure. It is from this perspective, that the market definition makes it possible, inter alia, to calculate market shares that would convey meaningful information regarding market

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[30] Commission Notice on the definition of the relevant market for the purposes of Community competition law; OJ [1997] C 372/5, [1998] 4 CMLR 177

power for the purpose of assessing dominance or applying Article 81 of the Treaty of Rome.

### *Definition of relevant product and relevant geographical market*

The regulations based on Articles 81 and 82 of the Treaty, in particular in section 6 of Form A/B with respect to Regulation 17, as well as in section 6 of Form CO with respect to regulation 4064/89 on the control of concentrations, have laid down the following definitions. Relevant product markets are defined as follows:

*"A relevant product market comprises all those products and/or services which are regarded as interchangeable or substitutable by the consumer, by reason of the products' characteristics, their prices and their intended use."*

Relevant geographic markets are defined as follows:

*"The relevant geographic market comprises the area in which the undertakings concerned are involved in the supply and demand of products or services, in which the conditions of competition are sufficiently homogenous and which can be distinguished from neighbouring areas because the conditions of competition are appreciably different in those areas."*

The relevant market within which to assess a given competition issue is thus established by the combination of the product and geographic markets.

The judgements of the European Court of Justice as well as the position of the EU Commission show that the definition of the market is essentially a matter of interchangeability (or substitutability). Where goods or services can be regarded as interchangeable, by reason of the products' characteristics, their prices and their intended use, they are within the same product market.

### *Substitutability*

The EU Commission explains in Article 13 of the Notice that firms are subject to three competitive restraints, demand-side substitut-

ability, supply-side substitutability and potential competition. For the purpose of market definition, it is demand-side competition that is of the greatest significance. The assessment of demand substitution entails a determination of the range of products which are viewed as substitutes by the consumer. It then proposes a test whereby it becomes possible to determine whether particular products are within the same market, the so-called "SSNIP" test.

The **SSNIP**-test aims to answer the question whether a hypothetical monopolist in the given market would be able to increase profits by imposing a **S**mall but **S**ignificant **N**on-transitory **I**ncrease in **P**rice. Whether such a price increase is profitable or not depends on whether the consumers would switch their purchases to other makes of the product (or even other products) as a result of the price increase.

Should the hypothetical monopolist not profit from such a price increase i.e. the consumers *do* substitute the product, then the market is too narrowly defined. The nearest substitute is added and the test is repeated. When it can be determined that the hypothetical monopolist would indeed profit from such a price increase, the relevant product market is defined.

In its Notice, the EU Commission suggests examples of evidence that may be used in defining the relevant product market. Such examples may consist of evidence of substitution in the recent past, quantitative tests trying to estimate own-price and cross-price elasticities for the demand of a product, based on the similarity of price movements over time, the causality between price series and the similarity of price levels and/or their convergence. The views of customers and competitors on market definition are valuable in the process. Barriers and costs associated with switching demand to potential substitutes may limit the way that two *prima facie* demand substitutes belong to one single product market. Different categories of customers and price discrimination may narrow the extent of a product market.

The physical characteristics of a product may be an important issue to take into account for the purpose of identifying the product market, and when it comes to determining substitutability, it is also relevant to look at the use for which a particular purchaser requires a certain product, since this could give information as to whether the products belong to the same market.

## 4.2 The Products

In this chapter we will analyse the market for both the sweeteners included in the Common Market Organisation for Sugar and for those sweeteners which are not included, but which, depending on their interchangeability with the former, in the view of buyers and the consumers, may be used as substitutes.

The different categories of sweeteners can be divided into *natural sweeteners* consisting of sugar and sugar-like products, *polyols* such as Sorbitol, and *High Intensity Sweeteners* (HIS) such as Aspartame.

### *Sugar*

Sugar[31] is the conventional name for sucrose, which is extracted from sugar beets or from sugar cane. Sugar cane is grown in tropical and semitropical climates, while sugar beet is grown in temperate climate conditions. The largest sugar cane producers are India, Brazil, China and Mexico (FO Lichts (2002)) and the largest sugar beet producers are the European Union, the United States, Turkey and Poland (ibid.). Sugar cane has a sugar content of 12-18 per cent. The yield from sugar cane varies considerably but a rough estimate is 15 tons per hectare (NEI (2000)). Sugar beets have a sugar content of 15-20 per cent. However, the yields of beet per hectare are much lower than the yields of sugar cane and the resulting sugar yield is only about 8-10 tons per hectare (ibid.).

Sugar cane is grown for 10-18 months before harvest. It is delivered to a mill where it is crushed to separate the juice, which contains the sucrose, from the fibres. The juice is then processed into raw sugar, boiled and seeded with small sugar crystals until the raw sugar has crystallized. Raw sugar contains impurities, which affect its colour and flavour, and needs further processing before it is used in foodstuffs. The raw sugar is then transported to a refinery where impurities are removed. The raw sugar crystals are dissolved and the liquid is carbonated or phosphated trapping the impurities in a precipitate. Finally, the liquid is boiled, and sugar crystals are

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[31] This section draws mainly on NEI (2001) and Larsson (1996)

formed. The refineries produce a range of sugar products, both for household and industrial use.

Sugar beets are grown for about eight months before harvesting. This takes place in autumn and early winter, when the sugar content is at its highest. Contrary to cane sugar, sugar from sugar beet is produced in a single process. After transport to the beet sugar processing plant, the beets are sliced and soaked in hot water and the sugar is diffused into the water. The liquid is then directly purified by carbonation, and thereafter boiled until crystals have formed, as in the refining process for sugar cane.

Sugar from sugar cane constitutes about 70 per cent of total world production of sugar, and sugar from sugar beet 30 per cent. Chemically, sugar from sugarcane and sugar from sugar beets is identical, as both consist of 99.9 per cent sucrose.

According to the EU Commission, sugar can be divided into three product categories: white granulated sugar, liquid sugars and specialty sugars (EU Commission L76/22 (1998)). This categorisation seems to be applicable to both industrial and household sugar. White granulated sugar is in solid crystallised form, and the crystals have an average size of 0.6 mm. It is sold both to industrial buyers and household customers. Liquid sugars are mainly used by the food processing industry. They are either produced by dissolving granulated sugars or as a by-product of the sugar cane refining process. Specialty sugars are all sugars other than white granulated, such as brown sugar, caster sugar (sugar crystals of smaller size than white granulated sugar) and icing sugar (ground white granulated sugar).

Industrial buyers of sugar are the food processing industry, and the chemical and pharmaceutical industry. 70 per cent of total human sugar consumption in the EU is sugar incorporated in food and drinks, and 30 per cent is direct consumption of pure sugar by households. The chemical and pharmaceutical industries represent less than 2 per cent of total sugar consumption (NEI (2000)).

### *Other natural sweeteners*

Natural sweeteners are produced from maize, starch potato, wheat or rice starch. Most natural sweeteners have similar sweetness, ca-

loric value and bulk characteristics as sugar. High fructose syrup, high fructose corn syrup, inulin syrup, glucose and dextrose belong to this group.

High Fructose Syrup (HFS), which goes under a variety of product names such as Isoglucose, Isomerose, and High Fructose Corn Syrup (HFCS) is glucose syrup in which a part of the glucose has been isomerised to fructose (in practice to 42 or 55 per cent[32]). HFS with 50 per cent fructose has the same sweetness as sugar (Larsson (1996)). It is a liquid, and is used mainly in the beverage industry, but also by food processing manufacturers, bakery and cereal producers and producers of dairy products. It cannot be substituted for sugar in direct consumption (Cooper et al (1995)).

In 1995 the price of HFS (in white sugar equivalents) was 35 per cent lower than the price of sugar in the US and 13 per cent lower than the price of sugar in the EU (NEI (2000)). The world's largest HFS producers are the US, Canada and Japan. The production and consumption of HFS has increased substantially over the last few decades. During the period 1991-1996, world production of HFS grew by 20 per cent, while world production of sugar grew by 4 per cent (ibid.).

The US is a major producer of HFCS. In the US, HFCS consumption increased by more than 300 per cent in the period 1980 to 1999 and it constituted around 42 per cent of total sweetener consumption in 1999 (USDA (2001)). According to Devadoss and Kropf (1996), high price support policies for sugar in the US have encouraged rapid expansion of HFCS consumption at the expense of sugar.

In the EU, HFS was incorporated in the CMO sugar in 1977 and thereafter HFS production has been limited by a quota, which is equal to 2.1 per cent of the total sugar quota. Spain and Belgium are the main producers of HFS in the EU, and their quotas together correspond to 51 per cent of the total HFS quota (NEI (2000)). During the 1990s, production of HFS has remained stable at around 300 000 tons of dry matter per year, which corresponds to the quota level. Very little HFS is exported and imports of HFS are limited by import duties. As a result EU production and consumption of HFS

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[32] Interview with Barjol, J-L., CEFS

has been fairly constant over the period 1990-2000 (ibid.). In 1995, HFCS accounted for 2 per cent of total sweetener consumption in the EU, compared to 8 per cent of total world sweetener consumption.

Production costs of HFS in the EU are high relative to the US. The quota system has reduced flexibility and mobility in the industry, and thereby the possibility of taking advantage of increasing returns to scale. There have been no changes in quota allocations since 1981. In addition, the cost of maize in the USA is lower than the average cost in other HFS producing countries, including the EU. Production costs of HFS are about 50 per cent higher in the EU than in the US (NEI (2000)).

In comparison to sugar, HFS has poorer storage quality and higher transport costs (NEI (2000)). Since HFS is in liquid form, some industries must incur an adjustment cost in order to use it in production. In the beverage industry, the adjustment cost is low since the final product is also in liquid form. In the jam industry, for example, the water in a liquid sweetener must be evaporated. However, the costs of HFS production are only 33-40 per cent of the production costs of sugar in the major sugar exporting countries, mainly due to lower costs of raw material (ibid.). A similar comparison with the lowest cost cane sugar producers shows that the production costs of the major HFS producers are still higher than those of the lowest cost sugar producers (USDA (2001)).

HFS can be considered a substitute for sugar in some industrial uses, especially production of beverages. Over 90 per cent of deliveries of HFCS-55 (containing 55 per cent fructose) in the US are for the beverage industry (USDA (2002)). Producers of soft drinks and syrups could use HFS for up to 95 per cent of their sweetener consumption while the jam industry could use HFS for abut 50 per cent of its consumption. The corresponding figure for the bakery, dairy and ice cream industry is 25 per cent.

The Sugar Research Institute SRI (2002) argues that HFCS is a significant competitor to sugar particularly in the USA, Canada, Japan and Korea. According to Cooper et al (1995), HFS is the main competitor of sugar. In addition, Williams and Bessler (1997) find that during the period 1984-1991, the price of HFCS in the US was determined by the price of refined sugar. However, Beghin et al (2001) claim that the possibilities for sugar and HFCS substitu-

tion in the US have decreased over time, as technological advances have improved HFCS products and created more specialised sweetener markets. Thus, the shares of HFCS in total US sweetener consumption should remain fairly stable with respect to the price of sugar.

In the EU the actual extent of substitution between HFS and sugar in total EU sweetener consumption depends on the relative production costs and prices of HFS and sugar, and on the share of the beverage industry in industry sweetener consumption. Without the quota restriction on HFS in the EU, it is probable that a larger share of industrial sweetener consumption would consist of HFS, since production costs of HFS are lower than those for sugar produced in the EU. Assuming constant sugar prices, Cooper et al (1995) have estimated that if production of HFS were unrestricted in the EU, it could replace about 25 per cent of the industrial use of sugar. EU producers of HFS use maize, wheat and starch potato as inputs (NEI (2000)). The CAP covers all these products, and if a reform of the CAP results in decreases in their prices, production costs of HFS should decrease. A lower price for HFS would probably result in an increased substitution of sugar for HFS where technically possible, if HFS production had not been restricted.

Inulin syrup is produced by hydrolysis of inulin, which is extracted from chicory roots. Inulin syrup contains 80-85 per cent fructose and 10-15 per cent glucose. It is only produced in the EU (NEI (2000)). Inulin syrup has similar characteristics to HFS and liquid sugar, and is used mainly for soft drinks, ice cream and bakeries. It has higher sweetness than sugar. Inulin syrup is covered by the CMO and subject to the same regulations as HFS. Inulin syrup production is limited by a quota, which is equal to 2.2 per cent of the total sugar quota. However, declining demand has resulted in production lower than the quota, and in 1997/98, only 65 per cent of the quota was used (NEI (2000)). Both inulin syrup and sugar can be used for the production of levulose (fructose), but only sugar is actually used. According to NEI (2000), it is an indication that inulin syrup is relatively more expensive than sugar. They argue that the low demand for inulin syrup in the EU implies that it cannot be regarded as a substitute for sugar.

### *Polyols*[33]

Polyols are alcohols, industrially produced through hydrogenation of saccharides such as glucose, dextrose and fructose. Polyols have a low calorie content and a lower sweetness than sugar. They are suitable for dietary and diabetic food, since they are not or only partly metabolised and thus require a lower insulin dose for digestion than sugar. They have a laxative effect if consumed in large quantities. Polyols are used in the food, beverage, confectionery, pharmaceutical and cosmetic industries. In foodstuffs, they are mainly used in dietary and sugar free products. In the EU, polyols are categorised as additives, and must be approved by the Scientific Committee for Food (SCF). For approved polyols there are no restrictions on the maximum polyol content in foodstuffs. The polyols approved for food use are Sorbitol, Xylitol, Lactitol, Mannitol, Maltitiol and Isomalt. Sorbitol is the most commonly used polyol, since it is the least costly. It is used in sweeteners for diabetics and in sugar free confectionery. It does not promote tooth decay. Xylitol is the sweetest, with a sweetening power equal to sugar, but it is much more costly. Its main application is in sugar free confectionery, such as chewing gum. Like Sorbitol, it does not promote tooth decay. Maltitol is less sweet than Xylitol, and is also used for sugar free confectionery. The main area of application for Mannitol is in pharmaceuticals. Lactitol has a relatively low sweetness and is used mainly in ice cream and confectionery. The prices of polyols in sugar equivalent terms are higher than the EU sugar price (NEI (2000)).

According to NEI (2000), the demand for polyols is limited both at EU and world level, both because of their product characteristics and because of their higher price compared to sugar.

### *High intensity sweeteners*

High intensity sweeteners (HIS) are synthetically produced. They have a higher sweetness than sugar, and very low calorie content. Compared to sugar, they lack preserving and bulk characteristics. They are mainly used in dietary products and diabetic food (Larsson (1996)). High intensity sweeteners must be approved by the

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[33] This section draws largely on Larsson (1996).

SCF before they can be used in the EU. If a substance is approved, a value for the acceptable daily intake (ADI) is determined, and a value for the maximum content of the sweetener in different foodstuffs and beverages.

The amount of HIS in industrially produced food and drinks is often lower than the maximum amount, since the optimal taste of the product is reached at lower levels. The largest Swedish breweries claim that the actual HIS content in their products is half of the maximum content, or lower (Widenfalk et al (1998)).

In 1995, HIS accounted for 2 per cent of total sweetener consumption in the EU, and 8 per cent of total world sweetener consumption. The most commonly used HIS are Aspartame, Saccharine, Cyclamate and Acesulfame-K. One of the newest HIS, Sucralose, was approved for use in the US in April 1998 and by the EU Scientific Committee for Food in September 2000.

There is only limited substitutability between sugar and HIS because of their different functional properties (NEI (2000)). Likewise, the EU Commission (L76/22 (1998)) has found that HIS only compete with sugar for limited uses, such as dietary products, and therefore are not substitutes for sugar. According to Cooper et al (1995), competition between caloric sweeteners and low calorie sweeteners is indirect since final products are not identical, and part of the consumption of low calorie sweeteners corresponds to new markets for sweeteners. However, Widenfalk et al (1998) claim that some foodstuffs contain HIS without being marketed as “diet” or “low calorie” products. The reason for using HIS is that lower quantities of sweetener can be used compared to sugar, which reduces production costs. In the longer term, further product innovation may imply that high intensity sweeteners to a greater extent substitute for both industrial and household consumption of sugar. In addition, changing dietary preferences may increase the demand for HIS relative to the demand for sugar.

### *Conclusion*

The substitutability of a product can be divided into two factors; technical substitutability and economic substitutability. Technical substitutability refers to the ability of one good to replace another in the firm’s production process. Economic substitutability refers to

the condition that a substitution should be consistent with a firm's aim to maximize its profits. Technical substitutability is a necessary but not a sufficient condition for substitutability. In order for actual substitution to take place, it must be both technically possible and economically viable.

The substitutability of other sweeteners for sugar must be examined both in terms of technical and economical substitutability. Sugar for industrial use is technically substitutable with HFS in certain industries, such as the soft drinks industry. As regards economic substitutability, HFS has higher costs of production than the low cost producers of sugar from cane. Therefore in an unregulated sugar market, HFS would not be economically substitutable for sugar.

The regulated sugar market in the EU has prices, which exceed production costs for HFS, and thus HFS is *both technically and economically* substitutable for sugar. However, since HFS is regulated by a quota, it is not possible to substitute sugar by HFS. As regards inulin syrup, the low demand for the product indicates that it is not regarded by the buyers of sugar as a substitute for sugar.

The polyols have differing functional properties from sugar, and are thus technically substitutable for sugar for industrial use, but only to a limited extent, for example in sugar free sweeteners. In addition, their economic substitutability is also limited by the fact that their price in white sugar equivalents is higher than that of sugar.

The high intensity sweeteners are economically but not technically substitutable for sugar, other than for a limited range of products. Since the price of high intensity sweeteners is equal to, or lower than, the price for sugar, they would be economically substitutable for sugar. Apart from low calorie products, high intensity sweeteners do not currently have the functional properties to be technically substitutable for sugar for industrial use. Over time, product innovation may improve their technical substitutability.

For specialty sugars, there appears to be no substitute, and neither for white granulated sugar for household use. However, product innovation may improve the technical substitutability between high intensity sweeteners and sugar for household use.

Following the discussion above our analysis henceforth will focus on sugar for industrial use and sugar retailing.

## 4.3 The Geographical Markets

A figure that is widely cited in the literature on the effects of the CMO and among people in the sugar industry is that seven of the Member States have a “monopoly” in the sense that there is only one firm that controls the entire sugar quota in those Member States. The other Member States are said to be more competitive since they have two or more quota holders.

When looking at markets with the aim of assessing the extent of competition or market power, one has to delineate the relevant geographical market. The SSNIP-test can be used to delineate the geographical market. The market is considered to be a region where a hypothetical monopolist would find it profitable to make a small but significant and non-transitory increase in price, holding constant the terms of sales for all products produced elsewhere.

The assumption is that buyers will respond to a price increase by shifting to products produced outside the region. If “outside” the region is sufficiently attractive, an attempt by the hypothetical monopolist to raise prices would result in a reduction in sales sufficiently large to make the price increase unprofitable.

If a hypothetical monopolist does not find a small but significant and non-transitory increase in price profitable, a wider definition of the market is tried. The process of defining the market more widely continues until the hypothetical monopolist finds it profitable to increase prices.

A geographical market may, or most likely may not, be exactly as large as a country. The size of the geographical market is determined by a number of factors where production technology, demand properties and transport costs are perhaps the most important.

A few examples are in order, the markets for driving schools or daily newspapers are often restricted to a town or city and the surrounding area. To say that a country has 200 independent driving schools or 50 independent daily newspapers does not convey any information regarding the competitive situation in the relevant market. Each of the 200 driving schools or 50 newspapers may well be a monopolist in its own market.

Markets may, of course, be much wider than a country as well. Most countries in the world have no manufacturers of either large aircraft or personal computer operating systems. This does not mean that there is not fierce competition in these markets, since these markets are likely to be global, and manufacturers located in the EU and the US compete worldwide.

Were it not for the CMO it is cannot be excluded that the EU sugar market for white sugar would be a part of a market larger than the European Union.

In a report commissioned by CEFS,[34] it is assumed that the EU is one single market for sugar. This assumption leads to erroneous conclusions when comparing, for instance, firm concentration indices and competition with other regions.

Since production quotas in the EU sugar market are determined at the Member State level, it is all too easy without further thought to accept the Member State as the relevant geographical markets.

A relevant geographical market may be smaller than the national market as in our driving-school and newspaper example above. The fact that firms active on a national market have successfully managed to geographically separate that market, market-sharing, shall not be misinterpreted to mean that the geographical market is smaller than the national market. An example of where a national market has been geographically separated is Germany. According to the EU Commission (M.2530 Südzucker/SLS (2001)) Germany exhibits a geographical division with little interaction between the North (dominated by Nordzucker) and the South (dominated by Südzucker).

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[34] Ernst and Young presentation at CEFS meeting on 23rd October 2002

Figure 4.1: The German Sugar Markets


In conclusion, the reasoning above shows that a geographical market can be regional, national or in some cases even global. The German example shows that care must be taken when determining the geographical market, since firms actively try to separate markets

and sometimes they are successful. We do not define any geographical markets here but the impact of transport costs and geographical factors on the EU sugar industry will be discussed in detail in Section 5.

## 4.4 Sugar beet growers

As mentioned earlier, some of the main purposes of the CMO Sugar have been to maintain production, even in relatively inefficient areas, and to ensure a fair standard of living for beet growers within the Community.

Sugar is produced in all Member States except for Luxembourg. Almost 90 per cent of EU sugar supply comes from sugar beets grown in the Member States, and the rest is produced in Member States' raw cane sugar refineries. This raw cane sugar comes almost exclusively from the ACP States and India, the Spanish satellite states, the French DOM, the Canary Islands, Madeira, the Azores and Aegean Islands. These states are covered by special arrangements that originate in traditional trade flows. A small amount of sugar cane is grown in Spain (this amount equals approximately 10,000 tonnes w.s.e.). Due to these circumstances this part of the report will deal mainly with sugar beet growers.

Sugar beet growing represents some 45 000 full-time equivalent agricultural jobs. Due to technical progress, mechanisation, use of improved varieties and herbicides, the employment of agricultural labourers has practically disappeared in many regions. Fewer than 300 000 (four per cent) of the EU's seven million farms grow sugar beets. The sugar processing industry employs 52 000 although most of these jobs are only seasonal.[35]

A total of approximately two million hectares of sugar beets is harvested in the European Union. This equals 1.6 per cent of the EU's agricultural area. All the same, it represents 2.5 per cent of agricultural output by value.

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[35] Court of Auditors Special Report No 20/2000 concerning the management of the common organisation of the market for sugar, together with the Commission's replies (2001/C 50/01).

The largest sugar producing Member States are France, Germany and Italy. These Member States together account for more than 60 per cent of EU's total sugar production quota. Sugar beet is normally sown in March and April. Harvesting takes place between mid or end of September and the end of November and beet deliveries to the sugar processing plants end by mid December at the latest.

After beet has been harvested, its sugar content decreases over time. This is why sugar processing plants are always located in the beet-growing regions, so as to reduce the time lost before processing and transport costs. In general, beet is grown at distances not exceeding about 100 or at the very most 200 kilometres from the sugar processing plant in which it is processed.

The sugar yield from sugar beet depends firstly on its sucrose content, which varies from harvest to harvest, and, secondly, on the refining techniques used and on the quality of the equipment. From one tonne of sugar beet having a sugar content of 16 per cent (average rate for sugar beet grown in Europe), sugar processing plants established in the Community obtain between 125 and 150 kilograms of sugar.

Beet yields vary considerably among sugar producing Member States. Since the CMO Sugar aims to protect the financial situation of beet growers even in relatively inefficient regions, it puts normal market forces out of play. The yield differs between 4 tonnes/hectare in the south of Spain to 12 tonnes/hectare in France (Åberg (1999)). An imaginary band across Northern Europe constitutes a zone where growing conditions are most favourable from the point of view of climate and soil conditions. It covers an area that stretches from the South of Sweden to the North of Italy and Spain. The best conditions are found north of Loire, in Belgium and in Germany. A typical yield of white sugar is around 9 tonnes/hectare. Average yields in Spain and Finland are far below this, 6 and 5 tonnes/hectare respectively, followed by Sweden and Italy with 7 tonnes/hectare.

The production of beets is by necessity an integrated part of the sugar processing industry, and properties of the raw material contribute to an increased concentration of both cultivation and processing in order to reduce transport costs.

The regulation setting up the relationship between the grower and the processors and establishing inter-trade agreements, dates back to the origins of the CMO Sugar. There have been no real amendments to the original rules.

Almost all beet growers are organised in producer groups that aim to promote and strengthen their position in their contact and negotiations with the sugar processors.

The total quota level is based on the individual Member State's national quotas adjusted to a 16 per cent sugar content level of the beet. This is done through the inter-trade agreements – a framework laid down by the CMO Sugar for the contracts between growers and sugar processors – which contain provisions regarding the quantity, quality, delivery periods, payment schedules etc. The outcome of these negotiations differs nationally and depends on bargaining power and local traditions.

On the basis of the production quotas allocated to each Member State and the sugar processors within the Member States, the processors in turn provide "beet delivery rights" to individual growers that supply sugar beets. In some Member States, beet delivery rights are tradable between beet growers under certain conditions. Here we observe a tendency for beet growing to move to more productive regions.

The distribution of quotas (or beet delivery rights) to individual growers is usually based on traditional relations between the processor and the growers (NEI (2000)). Generally, the delivery rights in a particular year are equal to the average level of beet production during a reference period. Only growers with a significant decrease in production during more than one year (more than 8 per cent) might lose part of their rights. The most common reason for transferring delivery rights is the closure of a particular farm. In some cases, delivery rights then revert to the processor, which may reallocate them to other beet growers. In other cases, delivery rights are transferred to the grower who buys the land. Although the CMO Sugar provides the framework for the relations between the beet producer and processing plant, the precise content of the contracts is determined by the parties to the contracts, and is thus beyond the influence of the CMO Sugar.

Payments from processors to growers differ throughout the European Union. In some Member States, e.g. France, Germany and Sweden, growers are paid different prices for A- and B-beets, whereas growers in other Member States, such as Italy and Ireland, receive an average single, or a so-called mixed price. The latter price system has to be approved by the Member State concerned.

Since sugar beets are not tradable in their natural state, sugar beet prices are converted to w.s.e. by a conversion rate. Since beets and cane are not storable and cannot be used for consumption without processing, both growers and processors are supported by the regime, creating mutual dependency between them.

International trade in beet is relatively small. It has happened, notably in 1975 that, following a low beet harvest in Belgium, French beet was supplied to Belgium by the trainload for refining. Apart from these rare occasions, intra-community trade in sugar beet involves mainly those Member States that have growing areas that are close or adjacent to the frontiers of another Member State. This is the case with France and Belgium, Belgium and the Netherlands and the Netherlands and Germany.[36]

There is some interdependency between beet growers and sugar processors as beet growers need the processors to ensure maximum returns and the plants, which are highly capital intensive, need adequate beet to operate as they do not have any alternative use.

The sugar industry is becoming further integrated as the trend towards vertical integration between beet growers and sugar processors continues. This is the case e.g. in Germany, where Nordzucker and Südzucker are cooperatives owned to a large extent by beet growers. Due to beet growers owning Südzucker, sugar processors owned by Südzucker in Belgium, France (SLS) and Austria (Agrana) are to some extent cooperatively owned as well. In France, beet growers have purchased a stake in Béghin-Say, and the Italian part of Béghin-Say has been purchased by Italian beet grow-

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[36] Sugar Beets, OJ [1990] etc Commission Decision of 19 December 1989 relating to a proceeding under Article 85 of the EEC Treaty (IV/32.414 – Sugar beet) OJ L31, 02/02/1990 p. 32-45.

ers. In Finland, the monopoly, Sukros, is 80 per cent owned by Danisco and 20 per cent by Finnish beet growers.

This trend towards integration downwards into the sugar processing industry may suggest that beet growers perceive that sugar processors get a large share of the profit. However if beet growers own sugar processors their interest in a change in the present regulation would be limited, since the regulation in practice also protects the interests of the sugar processing industry.

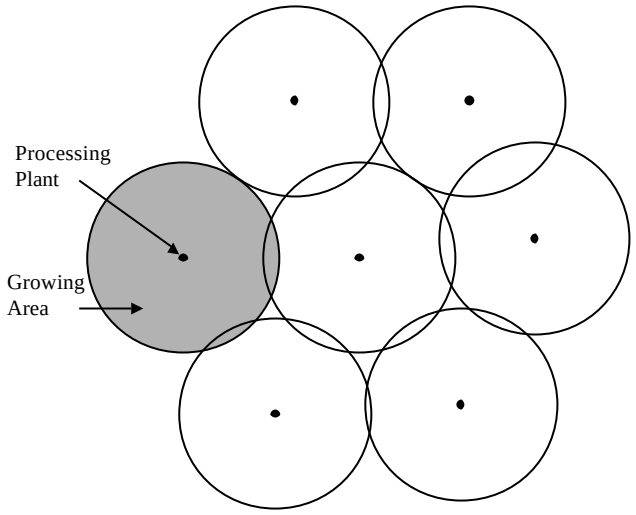
## 4.5 The processors

One factor of importance in the production process of any crop, and the subsequent market outcome, is geography. For instance, rape or beet have to be grown over a large area, harvested during a certain period of the year, and brought to the plant for processing.

As regards processing, there is a fixed cost involved in setting up a plant for processing sugar, comparable to that involved in the beer, tobacco, petroleum or steel industries OECD (1998). The investment cost of a state-of–the-art cane mill and refinery/sugar processing plant has been estimated at USD 120-180 million (Todd (2002)) and €150 million (Court of Auditors (2000)).

To minimize fixed costs a firm prefers fewer but larger plants. On the other hand, the cost of transporting beet to the plant and transporting the refined product to the buyer increases with distance, which means that the firm would prefer a larger number of processing plants.

Figure. 4.2: Growing crops




The optimal plant size is thus a compromise between the need to minimize fixed costs and the need to minimize transport costs. The plants will thus be dispersed, and a processor will naturally possess some market power over buyers located far away from any alternative supplier.

For the sugar industry, the optimal plant size has been constantly increasing. Factors that have contributed to this development are increased harvests through fertilization and mechanization, and lower transport costs. As seen in Table 4.1, over the period 1990-2002 the number of sugar processing plants has decreased significantly in the Member States with the largest number of plants.

Table 4.1: Number of Processing Plants Having Participated in the Campaigns

| Member State | 1990/91 | 1995/96 | 2001/02 |
|---|---|---|---|
| Austria | 3 | 3 | 3 |
| Belgium | 11 | 9 | 8 |
| Denmark | 5 | 4 | 3 |
| Finland | 4 | 3 | 2 |
| France | 50 | 45 | 34 |
| Germany | 37 | 39 | 30 |
| Greece | 5 | 5 | 5 |
| Ireland | 2 | 2 | 2 |
| Italy | 31 | 23 | 20 |
| The Netherlands | 7 | 6 | 5 |
| Portugal | - | - | 1 |
| Spain | 24 | 20 | 13 |
| Sweden | 6 | 4 | 2 |
| United Kingdom | 12 | 9 | 7 |
| Total | 197 | 172 | 135 |

Source : www.cefs.org and www.ib.be/cefs/somstatistics.htm

Since sugar production has increased during this period while the total number of plants has decreased, average plant size has increased by 25 per cent between 1988/89 and 1998/99 (NEI (2000)).

Table 4.2: The Number of Sugar Processing and Refining Companies in the EU Member States

| Member State | 1982/83 | 1990/91 | 1995/96 | 2001/02 |
|---|---|---|---|---|
| Denmark* | 2 | 1 | 1 | 1 |
| Sweden* | 1 | 1 | 1 | 1 |
| Finland* | 2 | 1 | 2 | 2 |
| Austria | 4 | 1 | 1 | 1 |
| Greece | 1 | 1 | 1 | 1 |
| Ireland | 1 | 1 | 1 | 1 |
| Portugal | - | 2 | 4 | 1 |
| Netherlands | 2 | 2 | 2 | 2 |
| United Kingdom | 2 | 2 | 2 | 2 |
| Spain | 13 | 5 | 4 | 3 |
| Belgium | 10 | 11 | 7 | 5 |
| Italy | 16 | 16 | 10 | 9 |
| Germany | 29 | 12 | 15 | 11 |
| France | 34 | 30 | 26 | 16 |
| EU total | 88 | 74 | 77 | 53 |

Source: CEFS statistics and OECD (1998), *Danisco controls (2002) the entire production quota.

The number of independent firms is also falling as a result of a series of mergers between sugar producing firms. The number of sugar processing and refining companies in the EU decreased by 33 per cent during the period 1988/89 to 1998/99 (ibid.). In addition, some of the sugar producing firms in different Member States are part of the same business group, which increases concentration further, e.g. Agrana (Austria) and Azucarera Ebro (Spain) are partly owned by Südzucker (50 and 13.5 per cent) respectively. Average sugar production per firm per year has increased from 146,495 in 1988/89 to 256,328 tonnes in 1998/99 (ibid.).
Sugar production in the EU is restricted by quotas. Quotas for Member States are divided among the producers of each Member State. The distribution of quotas per firm is given in Table 4.3.

Table 4.3: The EU Sugar Producing Firms and their Production Quotas 2000/2001

| Member State | Sugar Company | Total quota | % of nat'l quota |
|---|---|---|---|
| Finland | Sukros (Danisco) | 146 776 | 100 |
| Denmark | Danisco Sugar | 424 629 | 100 |
| Sweden | Danisco Sugar | 370 000 | 100 |
| Greece | HSI | 319 000 | 100 |
| Austria | Agrana | 390 410 | 100 |
| Ireland | Greencore | 200 200 | 100 |
| UK | British Sugar | 1 144 000 | 100 |
| Portugal | DAI | 70 000 | 87.5 |
| | SINAGA | 10 000 | 12.5 |
| Spain | Azucarera Ebro | 782 474 | 78.2 |
| | ACOR | 147 794 | 14.8 |
| | ARJ | 69 732 | 7.0 |
| Netherlands | Cosun | 544 000 | 62.4 |
| | CSM | 328 000 | 37.6 |
| Belgium | RT | 620 344 | 75.1 |
| | Groupe Sucrier | 151 486 | 18.3 |
| | Fontenoy | 54 171 | 6.6 |
| Italy | Eridania Béghin-Say | 794 225 | 50.6 |
| | SFIR | 295 472 | 18.8 |
| | Sadam | 280 620 | 17.9 |
| | Co. Pro A.&B | 110 522 | 7.1 |
| | Molise | 87 411 | 5.6 |
| Germany | Südzucker | 1 375 818 | 39.9 |
| | Nordzucker | 1 183 365 | 34.3 |
| | P&L /Diamant | 617 783 | 17.9 |
| | Jülich | 145 782 | 4.2 |
| | Danisco Sugar | 126 565 | 3.7 |
| France | Eridania Béghin-Say | 1 179 156 | 35.5 |
| | Südzucker | 730 479 | 22.0 |
| | SVI | 352 155 | 10.6 |
| | USDA | 342 456 | 10.3 |
| | Cristal Union | 307 595 | 9.3 |
| | Pca[1] | 892 900 | 26.9 |
| | Others[2] | 164 543 | 5.0 |
| EU total | | 14 592 411 | |

Source: Krick (2000)

[1]Pca = Pool of 6 agricultural cooperatives (inclusive USDA and Cristal Union) and half of one company assimilated, each with a total quota of between 17000 and 340000 tons.

[2] These are four companies and half of one company assimilated, each with a total quota of between 17000 and 60000 tons.

Given that we have defined relevant geographical markets, we can assign market shares to each firm in these markets. As can be seen in Table 4.4, a number of Member States have one firm with a market share of 90 per cent or more. A given firm's market share is not necessarily equal to that firm's share of the national quota since there is some trade and there are firms which import raw cane sugar. In addition, if the market is smaller than the Member State, a firm with a small share of the national quota may have a large market share.

Table 4.4: Market Shares on National and Sub-National Markets for Industrial Sugar

| Market | Largest firm | Second largest firm/firms | Third largest firm/firms |
|---|---|---|---|
| Finland | Sukros (Danisco) ( >90%) | | |
| Denmark[2] | Danisco (>90%) | | |
| Sweden[2] | Danisco ( >90%) | | |
| Greece[2] | HIS (>90%) | | |
| Austria[2] | Agrana (>90%) | | |
| Ireland[2] | Greencore (80-85%) | | |
| UK[3] | British Sugar (>50%) | Tate & Lyle (30-40%) | Napier Brown (15-20%) |
| Portugal[2] | DAI (>90%) | | |
| Spain[3] | Azucarera Ebro (75-80%) | Acor (10-20%) | |
| The Netherlands[3] | Cosun (n.a.) | CSM (n.a.) | |
| Belgium[1] | Südzucker (60-70%) | Groupe Sucrier (15-25%) | Saint Louis Sucre (<10%) COSUCRA (<10%) |
| Italy[1] | Béghin-Say (35-45%) | Südzucker (10-20%) S.F.I.R. (10-20%) | Saint Louis Sucre (<10%) |
| Germany[1] | Südzucker (30-40%) | Nordzucker (25-35%) | Pfeifer & Langen (15-25%) |
| South of Germany[1] | Südzucker (75-85%) | Saint Louis Sucre (<10%) Pfeifer & Langen (<10%) Béghin-Say (<10%) | |
| France[1] | Béghin-Say (20-30%) | Saint Louis Sucre (10-20%) Sucre Union (10-20%) | Südzucker (<10%) |

[1] Source: European Commission Case No. COMP/M.2530- Südzucker/Saint Louis Sucre Marktanteile für das Kampagnejahr 1999/2000
[2] Own calculations based on FO LICHTS (2002)
[3] Own calculations based on company material
SFIR= Società Fondaria Industriale Romagnola

EU sugar producers are organized in an industry association, called Comité Europeén des Fabricants de Sucre (CEFS). CEFS´s purpose is to represent and defend the interests of all European sugar manufacturers and refiners with respect to EU institutions and different international organizations. CEFS members currently encompass European producers and refiners of sugar, at present 56 companies. CEFS works for the preservation of the CMO sugar in its present state.

Producers of sugar within the EU face high costs of production relative to sugar producers outside the EU. The production of sugar from beet is costly compared to production of sugar from cane. In addition, production of sugar from beet in some regions in Europe is costly compared to production of sugar from beet in other regions outside the EU. As indicated in the Table 4.5 below, production costs vary substantially.

Table 4.5: Cost Estimates, Cane and Beet Sugar €/100kg

| | 1994-95 | 1995-96 | 1996-97 | 1997-98 | 1998-99 |
|---|---|---|---|---|---|
| Refined beet sugar | | | | | |
| Low Cost Producers | 36.3 | 40.7 | 45.1 | 41.6 | 46.9 |
| Major Exporters | 43.4 | 47.3 | 50.6 | 46.3 | 51.2 |
| Refined cane sugar | | | | | |
| Low Cost Producers | 18.8 | 20.7 | 23.1 | 22.4 | 23.2 |
| Major Exporters | 24.3 | 25.5 | 28.5 | 28.2 | 28.0 |
| HFCS/HFS | | | | | |
| Major Producers (USA) | 23.0 | 29.2 | 26.5 | 25.2 | 24.3 |

Source: USDAA, Sugar and Sweetener Outlook, September 2001

Examples of low cost producers are Belgium, France and the UK, whilst Germany is an example of a major exporter.

A conclusion that can be drawn from Table 4.5 is that even the most efficient producers of beet sugar have more costly production of sugar than the major exporters of cane sugar.

Frandsen et al (2001) rank the EU Member States according to their production of C-sugar and their quota fill. A high cost producer is assumed to be filling the A-quota but not producing B-sugar, while the lowest cost producers are assumed to be producing both A-,B- and C-sugar. Member States are then divided into high and low cost producers, and this information is used to derive marginal costs for producers in different Member States. The conclusion is that the

marginal costs of production of large scale producers in different EU Member States vary substantially. The marginal cost of the lowest cost producer is only 40 per cent of the highest cost producer within the union. Portugal, Greece and Finland have such high marginal costs that they do not fill their B-quota.

The intervention price for sugar has been determined on the basis of estimates of the margin necessary to cover the costs of processing beet sugar for a high cost producer in the EU. This implies that producers in regions with favourable climate and soil conditions can earn additional profits from the difference between the estimated costs of high cost producers and their actual costs.

In its report in 2000, the European Court of Auditors argues that the EU Commission has not reviewed the data underlying the estimate of the processing margin, the margin between intervention price and minimum beet price, frequently enough and that the data available to the EU Commission "are not in sufficient detail to enable the processing costs to be verified". Further, it is argued that better cultivation techniques have improved capital utilization and that interest rates have fallen since the EU Commission last made its estimate of processing costs.

The concentration observed in production and the increase in average plant capacity should imply a reduction in the marginal cost of production. But increased plant capacity also means higher transport costs as can be seen in Figure 4.2. Whether the net effect is an increase in processing margin is an issue on which processors and buyers disagree.

The Committee of Industrial Users of Sugar (CIUS) has made estimates of the actual processing costs of sugar, and they argue that the effective support price should be reduced by 16.5 per cent in order to reflect improvements in, among other things, sugar extraction from beets, reduction in energy usage, energy prices and interest rates (CIUS Proposal 1998).

The sugar producers, on the other hand, claim that they do not sell sugar at the intervention price, since the intervention price only covers the costs of production. The costs of many other activities, such as marketing and packaging etc. are not included in the intervention price, and therefore, the actual price to the buyer must always be higher.

*Distinctive features of the CMO Sugar*

The CMO sugar differs from other agricultural products regulated in the CAP, in that it is not the growers' product, the sugar beet, which is subject to the majority of the regulatory measures, but the processed product, sugar. The only measure directly affecting growers is the price of basic beet. The 1992 reform of the CAP emphasized a shift from price support of agricultural products to direct income support, which accrues directly to the grower. However, the CMO sugar was not included in the 1992 reform and thus still mainly regulates the processing companies and the refined product, sugar.

It is argued by the OECD (1998) that the sugar producers in many cases have a very strong bargaining position vis-à-vis the individual beet grower. Because of the transport costs involved in beet transport and the economics of scale in processing, many growers have only one possible buyer. Thus the local sugar processor has a monopsony within a certain region, and can use its bargaining power to secure the entire difference, some 10 per cent, between market price and intervention price. Growers receive the basic beet price for their beets, irrespectively of the actual market price for the processed sugar.

## 4.6 Industrial and retail buyers

In accordance with the definition of the product market, where sugar for industrial use and for household use were considered to be two distinct products, buyers can be divided into two categories; industrial buyers and retailers selling to households. In order to exemplify the buyers' position on the EU sugar market, a study of the Swedish sugar market has been conducted. Interviews with purchasing managers representing both industrial buyers and retailers have been undertaken. The results of the interviews are presented below. Further we have conducted interviews with multinational industrial buyers who conduct sugar purchases in several EU Member States. These interviews suggest that the buyer situation on the EU markets is similar to that on the Swedish market.

## *Swedish market*

### *Industrial buyers*

The industrial buyers of sugar in Sweden mainly consist of producers of soft drinks, confectionery, ice cream and bakery products. The largest buyer has an annual purchase of sugar of around 35,000 tonnes of sugar, and the smallest an annual purchase of around 400 tonnes. The stated share of sugar purchases in total input costs ranges from 5 to 50 per cent. All of the buyers have the sugar producer Danisco Sugar as their supplier, and have had so since Danisco Sugar (henceforth the producer) bought the Swedish sugar producer Sockerbolaget in 1993.

### *Negotiations, prices and contracts*

Regarding contractual negotiations, the producer's official price list, which applies to almost all customers, is not regarded as negotiable. Some buyers claim that there are no contractual agreements specifying the price, instead the producer sends out its price list, which is automatically valid from a certain date. All buyers characterize their bargaining position *vis-à-vis* the producer as poor.

> *"One feels entirely powerless in the negotiations."*
>
> Purchasing manager, large industrial buyer of sugar

According to the buyers, changes in the official price list are a result of exchange rate fluctuations. Some buyers also claim that price changes can be a result of increasing production costs on the producer's part, and that these are neither justified nor negotiable. The reasonableness of these price increases is difficult for buyers to judge, since they have very little knowledge of the producer's cost structure. All buyers agree that the producer does not give the reasons for the prices set. It was pointed out by some large industrial buyers that this situation is very different from their relationships with suppliers of other inputs, where it is often the case that they know the cost structure of the supplier well and demand percentages cost savings over time.

Several industrial buyers who belong to multinational companies have centralized purchases of sugar on a European level. According

to some buyers this attempt to counteract supplier power has resulted in lower prices than when purchasing was conducted on a national level. One of the large buyers concludes that this increase in bargaining power is more the result of improved knowledge of processors' actual cost structures and market conditions than of increased purchasing volumes.

*"Even if we had purchased double our actual volume, we would not have been given a better price."*

Procurement manager, large industrial buyer of sugar

However, buyers still purchase from the same suppliers on each national market as before. Two buyers claim that when attempting to conduct only one negotiation with one supplier regarding sugar purchases for the Nordic countries, the supplier refused to conduct joint negotiations for several Member States by referring to the national quota system.

Some buyers tried to conduct price negotiations, while others have regarded it as impossible to negotiate the price list. There are two main reasons; the producer's monopoly power on the Swedish market, and the general perception that there is no other supplier willing to deliver sugar. In addition, most buyers believe that the producer's unwillingness to negotiate prices and deliver across borders is restricted by the regulations of the Common Market Organisation for Sugar. A majority of buyers believed that the price offered by the producer in July of 2002 SEK684.79 /100 kg (€75.4) was simply the intervention price converted to SEK. Only two buyers knew the actual intervention price and had concluded that the producer added a margin to that price.

All buyers have the same discounts for sugar purchased, as specified in the general delivery conditions. These include a volume discount, a discount for ordering quantities corresponding to full truckloads per delivery, and a volume bonus. Buyers seek to order quantities corresponding to full truckloads, but do not consider volume discounts or bonuses when placing their orders, since they are regarded as too small to be taken into account. According to the buyers, they do not know the prices and contractual agreements of other buyers. However, a general belief is that all buyers receive the prices and discounts of the official price list and general delivery conditions.

Many industrial buyers have small storage facilities for sugar and are dependent upon daily deliveries of sugar. Transport is in almost all cases undertaken by the producer, as agreed by the parties. The transport of bulk sugar and sugar solutions requires trucks and railway carriages specifically designed for this purpose, while transport of sugar in sacks does not require any special means of transport. The buyers consider the transport prices charged by the producer as reasonable or even low. They also find that deliveries are reliable.

All buyers are dissatisfied with the prices offered by the producer. They have a perception that the producer's margin is unreasonably high, resulting in unreasonably high input costs for their products and a competitive disadvantage *vis-à-vis* other products not containing sugar as well as for products not covered by the tariff on sugar-containing products. One example is soft drinks, which can be produced in Norway from sugar bought on the world market and exported to the EU and sold at a much lower price than soft drinks produced within the EU. A rough estimate is that a lower input price for sugar (the world market price), compared to the EU price, reduces the consumer price of the soft drink by approx. €0.10-0.15/liter. Some industrial buyers stated that the sugar price is an important factor when deciding on location of production facilities, and that continuously high prices make the location of production within the EU less interesting.

When exporting products containing sugar, industrial buyers get a refund as compensation for the high input price of sugar.

When selling within the EU industrial buyers receive no such compensation. However, many of the products containing sugar face an inelastic demand, and a major part of high sugar prices is passed on to consumers.

*Alternative suppliers*

A change of supplier would be technically possible for all Swedish buyers interviewed as there are no explicit switching costs, provided that no investments in storage facilities are required. All buyers agree that sugar is a homogeneous product that does not differ between suppliers.

Most of the buyers have tried to find alternative suppliers. However, their efforts have not resulted in any change. Importing from

Norway is not a viable alternative since the price including tariff is higher than the price offered by domestic producers. It has not been possible for Swedish buyers to purchase sugar from Danisco Denmark, which offers a lower price than Danisco Sweden. Even though the buyer might be situated close to the Danish border, Danisco Denmark has refused to make cross-border deliveries. The argument has been the need to adhere to the Member State specific quotas of sugar production in the CMO, despite the fact that it is production that is regulated by quotas, whilst trade is free.

Purchasing from other EU producers is not a viable alternative either. Producers on the European continent may offer a price which is lower than that offered by the domestic producer, but the net price including transport costs is always higher. The transport cost is fixed since suppliers on the European continent do not permit others to transport their sugar. In addition, other EU producers do not seem very interested in selling to Swedish buyers, and have not taken the initiative to contact any potential buyer. One industrial buyer states that when prices are requested, other EU producers simply refer to the intervention price plus a margin reflecting production costs, which is identical with the domestic producer's current price. There seems to be a general consensus among industrial buyers that it is the threat of possible retaliation which deters other producers from selling on the Swedish market.

*"Suppliers in other EU countries are unwilling to sell on [the producers] market, as they expect [the producer] to retaliate by selling on their markets. It is in every sugar supplier's best interest to stay out of each other's markets."*

Procurement manager, industrial buyer of sugar

Purchases from other EU suppliers may require investments in storage facilities if just-in-time deliveries are not possible. For buyers who had considered this option, the net cost would be higher than the cost of purchasing sugar from the producer.

A majority of industrial buyers claim that because of taste and the nature of the production process, there is no substitute for sugar in their production. The only opportunity to reduce costs of sugar purchases is to reduce sugar consumption. High intensity sweeteners for example are not an alternative in the chocolate and bakery industries, either because of health concerns or the effect on the taste

of the product. Some sugar buyers have tried to change their recipes in order to reduce sugar consumption, although this is a lengthy process, and can only partially reduce sugar consumption.

An exception from the non-substitutability of sugar is the beverage industry, where isoglucose is a good substitute for sugar. Given the regulated prices of sugar, usage of isoglucose is more cost efficient, as is evident from the US market where HFCS accounts for the majority of sweeteners used in beverage production. However, as isoglucose is also regulated by the CMO, it is not regarded as a viable alternative for the EU beverage industry.

Most industrial buyers forecast their sugar consumption will decrease in the long run, either as a result of substitution for sugar in production processes or due to the changing dietary habits of consumers.

Buyers consider the CMO Sugar complicated, although in most cases they believe they have a good knowledge of it. Some have received information about the regulation mainly from the producer, while others have also contacted the Swedish Board of Agriculture etc. Most buyers have not tried actively to work for a change in the regulation or improve their bargaining position, although they regard it as very unsatisfactory. They consider the regulation to be too complicated to be fully understood and regard the monopoly position held by the producer as a fixture. According to a majority of buyers, their respective industry associations have not been involved in this issue.

*Retailers*

The retailers on the Swedish market are the firms which purchase sugar in order to sell to consumers for household use. There are three main retailers on the Swedish market; ICA, COOP and Axfood.

All three retailers purchase all their sugar from the domestic producer. Similar to industrial buyers, they receive the producer's official price list and the prices offered are not negotiable. All retailers are dissatisfied with the prices and contractual agreements and have tried to change supplier. As is the case for industrial buyers, none has found an alternative supplier whose price including transport costs is lower than that offered by the producer. They have investi-

gated similar alternative suppliers and encountered the same problems as industrial buyers. The retailers expressed surprise over the fact that they have not been contacted by sugar producers other than the domestic producer, since they regard themselves as large buyers of sugar on the Swedish market for household sugar. One retailer suspects that the reason may be that there is a silent agreement among the sugar producers not to sell on each others' markets.

Although sugar is a product with low demand elasticity, retailers claim that it is one whose price attracts much attention and that margins on sugar are low. However, in the long run, a price increase will be passed on to consumers.

The retailer's industry association is not involved in lobbying for a change in the CMO Sugar, and individual retailers are not working for a change in the regulation nor of their bargaining position. They consider the regulation to be too complicated to be fully understood and the monopoly position held by the producer to be taken as given.

In conclusion, the buying power of both industrial buyers and retailers in Sweden is very poor, since there are no viable alternatives to purchasing sugar from the producer. Import tariffs ensure that imports from producers outside the EU are not an option, while producers within the EU all offer the same price as the domestic producer when transport costs are included, and generally seem unwilling to sell sugar on the Swedish market. The limited substitutability of sugar with other sweeteners also reduces buyer power.

Large purchasing volumes usually increases the buyer's bargaining power, and some industrial buyers of sugar do purchase large quantities of sugar. In addition, many multinational industrial buyers have central purchasing organizations conducting sugar purchase for all the sugar they use in the EU. However, under the CMO Sugar, suppliers are guaranteed the intervention price for all the sugar they produce within the A- and B-quota irrespective of the behaviour of buyers. In addition, since buyers have not found any alternative suppliers, the threat of withdrawing large quantities from the existing supplier is not viable.

*The EU markets*

The sugar market in individual EU Member States can be divided into two categories: Member States with only one quota holder, and thus only one producer, and Member States with two or more quota holders. For Member States which like Sweden have only one quota holder and very small amounts of imports, it is reasonable to expect there is a similar situation as in Sweden for industrial buyers of sugar as well as retailers. The purchasing managers of firms active in the Nordic Member States claimed that the same market conditions prevailed in Finland as in Sweden.

Interviews with representatives from the central purchasing organizations of two multinational industrial buyers of sugar have been conducted in order to provide an indication of the conditions on sugar markets in different EU Member States. In addition, potential differences and similarities between Member States could be discussed. The following information was obtained during the interviews.

One industrial buyer has annual sugar purchases corresponding to [...] tonnes and sugar constitutes around 20 per cent of the cost of goods sold. In each of the EU Member States where the company produces, it buys sugar from national suppliers. For those Member States that have two suppliers or more, the company uses multiple sourcing from 2-3 suppliers. The suppliers have been the same for the last couple of years. According to the central purchasing manager, the contracts and prices offered are similar across the EU, with the exception of slightly higher prices in the UK. The prices offered are the intervention price plus a so-called commercial margin, equal to 10-20 per cent of the price, depending on the supplier. Only small volumes can be shifted between suppliers, as no individual supplier is willing to supply a large volume.

The buyer has tried to switch supplier, but without success. Potential alternative suppliers either refuse to deliver to other Member States, referring to the national quotas stipulated by the CMO sugar, or simply quote such a high price that there is no decrease in costs. In most cases, suppliers are not willing to sell sugar ex works. They only quote prices for sugar delivered to the buyer. Buyers argue that this is a way for producers to control where their sugar is transported, enabling them to charge the highest possible prices.

According to one industrial buyer the ongoing restructuring of the sugar industry with increasing concentration can be viewed from two perspectives. In the short run, it allows producers to close high cost plants and thus reduce the cost of production. In the long run, increased concentration can be seen as a way of meeting the challenges of deregulation of the sugar market. If the sugar market is deregulated, high concentration could prevent prices and profits from falling. Several sugar producers are now buying sugar processing plants in the Accession Countries. The purchase of a processing plant is equivalent to the purchase of a quota, which can be expected to become very profitable if the supplier builds a new processing plant and sells its sugar at the intervention price or higher. The buyer states:

*"It is like buying a money printing machine."*

Purchasing manager, large industrial buyer of sugar

Other studies of buyers' conditions on the EU sugar markets yield the following results.

In its decision on the merger between Nordzucker and Union Zucker the German Competition Authority, Bundeskartellamt, analysed the buyer's situation on the sugar market. The average price of industrial sugar in Germany in 2001 was about 14 per cent higher than the intervention price. The Bundeskartellamt refers to a market investigation carried out for the case B2-91/98 where buyers considered there to be hardly any price competition on the market.

The EU Commission has reached a similar conclusion regarding the German sugar market. In the investigation for the merger case Südzucker/Saint Louis Sucre in 2001, it found that the geographical market is segmented into regional markets. This can be explained by transport costs and the fact that the three large sugar producers in Germany; Südzucker, Nordzucker and Pfeifer & Langen do not compete with each other. The reason is the high market transparency caused by the CMO Sugar and possible retaliation in the competitors' main markets (Southern, Northern, and Western Germany).

An investigation conducted by the European Court of Auditors in 2000 states that reimbursement for the costs of storing sugar and the

availability of export refunds means that no sugar is offered for intervention.

*"This has contributed to the situation where competitive forces are not functioning effectively and there is no real 'common market' for sugar. In discussions with the various stakeholders it became apparent that processors have little interest in competing with processors in other countries and remain largely in their home markets"* (C 50/15).

NEI (2000) discuss the reasons for the observed price differentials for sugar in the EU. The authors suggest that one explanation for the price differentials is that the EU sugar market is not one integrated market, but instead a number of national markets. In the majority of EU Member States, there are three producers or less, which creates an oligopolistic market structure. The control of national markets by a few processors in combination with limited intra-EU trade (due to the fixed quotas) effectively limits competition on EU sugar markets.

Industrial buyers of sugar in the EU have organized themselves into a lobbying association called CIUS. The Committee represents around 3,000 businesses, and their purchases of sugar are 9 million tonnes a year, which corresponds to 70 per cent of EU consumption of sugar. CIUS argues that current regulation reduces the competitiveness of industrial buyers of sugar. In recent years it has made several proposals for reforming the EU sugar regime, some of which involve reductions in the processing margin accruing to sugar producers, increases in the quota for isoglucose etc.

# 5 The Economics of sugar

This section does not construct a formal model of the EU sugar markets, rather we try to relate observations to some of the existing theories. We start by presenting the central empirical evidence from the EU sugar markets. In Section 5.1, we analyse what determines prices in markets with only one firm, in Section 5.2 we analyse markets with more than one firm in a spatial model. Section 5.3 provides an analysis of the possibilities for tacit collusion in the EU sugar markets. In Section 5.4 we discuss the effects of a number of policy changes within the model of tacit collusion.

Table 5.1 Market Prices, White Sugar, €/100kg

| Member State | Average Market Price Jan. 2001 |
|---|---|
| Austria | 73.76 |
| Belgium | not available |
| Denmark | 71.70 |
| Finland | not available |
| France | 77.96 |
| Germany | 72.86-73.80 |
| Greece | 73.07 |
| Ireland | 75.50 |
| Italy | 74.30-74.90 |
| Netherlands | 73.51[1] |
| Portugal | 78.56 |
| Spain | 77.60 |
| Sweden | 72.84[2] |
| United Kingdom | 72.95 |

[1]Oct-01, [2]Mar-01, Price is bulk ex factory in €/100kg, for a 5-10.000 ton buyer in large Member State and a 1-5.000 buyer in small Member State.
Source: CAOBISCO

The CMO sugar provides a price floor in the EU sugar markets. Since there has been no intervention over the last 15 years (NEI (2000)), exporting excess supply is always more attractive than

intervention. The price floor is the world market price plus export subsidies, around €67[37] depending on the outcome of export tenders. The average market prices for a number of Member States are given in Table 5.1, the average for all Member States is approx €74.5. Prices are consistently well above the export price, a fact that is noted by most studies of the EU sugar markets e.g. NEI (2000). A more comprehensive table of prices of industrial sugar within the European Union is given in Appendix 4.

There is some disagreement regarding actual transaction prices. The processor organization CEFS claims that prices are less than ten per cent above intervention price. The source of the table above is CAOBISCO/CIUS which represents industrial buyers of sugar.

NEI (2000) analyse data on industrial buyer prices of sugar in the EU and find that in September 1999, industrial buyer prices were on average 14 per cent higher than the intervention price plus storage levy, i.e. €74.3[38]. They found that prices were high both in Member States with a sugar deficit and in Member States with a sugar surplus, and that no clear correlation between price and demand/supply balance could be established. Data for prices in France, Germany and the UK indicate that the differential between actual sugar price and the intervention price has increased substantially from April 1992 to September 1999. During the same time period, processing, energy and transport costs have decreased and beet extraction rates have increased, i.e. processors' profit margins have increased even more than the nominal price.

In the investigation of the merger between Südzucker and Saint Louis Sucre,[39] the EU Commission found that the price level within the European Union is 10-20 per cent higher than the intervention price, i.e. €70-76.

The European Court of Auditors, in its evaluation of the CMO Sugar in 2000, states that "[e]vidence was found that factory gate sugar prices were on average 10 per cent above intervention prices

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37 The export refund is the intervention price €63.19 plus €5 minus a variable deduction determined weekly, thus the effective export refund is closer to €67.

38 Until the year 2000, a storage levy system was in place which added €2 to the intervention price of €63.19, i.e. the average price was 65.19*1.14 = 74.32.

39 Comp/M.2530, Commission clears acquisition of Saint Louis Sucre by Südzucker subject to commitments, Brussels 20 December 2001.

and considerably more in some countries". Ten per cent above the intervention price corresponds to at least €70.

Our investigations and interviews with individual sugar using industries regarding prices throughout the EU are fully in line with the studies mentioned and Table 5.1 above.

One aspect of Table 5.1 merits special attention; there is no clear pattern with respect to market structure which differs substantially between the EU Member States. Normally, we would expect markets with several producers to exhibit prices that are lower than monopoly markets. Seven of the Member States have only one producer who controls the entire quota of sugar, and for Denmark, Sweden and Finland, it is even the same firm, Danisco. France, on the other hand, has five large firms and ten smaller ones sharing the sugar quota.

## 5.1 One firm in the market

In the Member States with only one quota holder, at least the more distant ones like Sweden, Finland and Greece, there will be little competitive pressure from other firms within the EU. The other firms within the EU always have the alternative of selling their sugar at the intervention price or to export it. To reach the more distant markets within the Union they have to bear additional transport costs, which makes selling in these markets less profitable than selling for exports. The domestic firms in these Member States are in effect monopolists. Interviews with Swedish industrial buyers and retailers confirm that there is very little competition from sugar producers located in other Member States.

When there is little competitive pressure on a dominant firm in a market there is always the risk that the firm will abuse its dominant position. An example of abuse in violation of the competition law is the "Irish Sugar"-case where the EU Commission and later the Court of First Instance fined Irish Sugar Ltd for breaking the competition laws by abusive pricing.

A standard result in economics is that a monopoly firm will find it optimal to charge a price such that:

$$\frac{P - MC}{P} = \frac{1}{e}$$

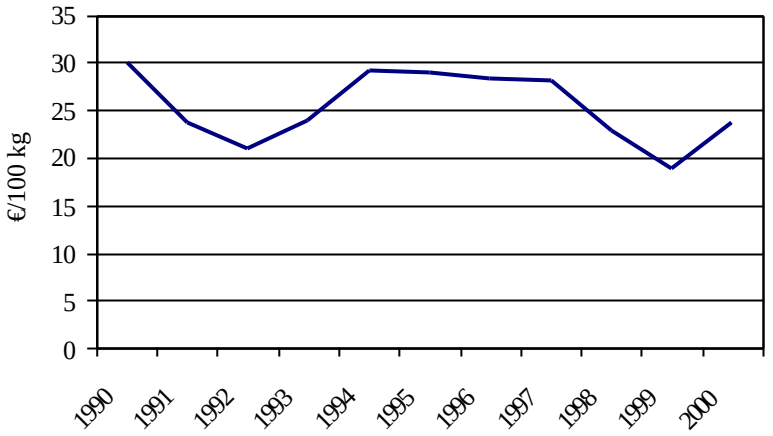
where P is the monopolist price and MC the marginal cost and $e$ is the demand elasticity. Demand elasticity is a measure of how sensitive consumers are to price changes, how quantity sold, q, reacts to changes in price p, $e = \frac{\Delta q}{\Delta p}\frac{p}{q}$. If a price increase of 1 per cent leads to a reduction in quantity of less than 1 per cent, demand is said to be inelastic. If $MC = 0$, it is optimal for a monopolist to set the price such that demand elasticity equals 1. With positive marginal cost, the monopolist will set prices higher, where the demand elasticity is larger than 1.

The current price elasticity of demand in the Member States is low, the average across Member States is 0.21, according to Dimaranan and McDougall (2002), and none of the Member States has a figure higher than 0.33. Thus, it appears that firms are not able to charge the full monopoly price.

Even though the import of non-preferential sugar is almost non-existent today, supply from abroad could easily substitute for sugar produced within the EU if the prices in the Union were to rise above the world market price plus tariffs. Thus, the world market price plus tariff sets a limit to the price within the EU. No producer within the EU can charge a price that is higher than the world market price plus tariffs.

The world market price is shown in Table 5.2 below. The world market price is sometimes below the cost of even the more efficient producers in the world. This is because of the residual character of the world market where e.g. the EU exports its surplus production using government subsidies. EU exports 6,412,000 tonnes out of the 21,307,000 tonnes white sugar that is traded on the world market (NEI (2000)). This puts a downward pressure on world market price.

Table 5.2: The World Market Price, White Sugar No.5




Source: LIFFE, London International Financial Futures and Options Exchange

The world market price is determined at the London Futures Exchange where white sugar is traded. Standard white sugar is known as white sugar No 5.

When world market prices are in the range of €20-25 /100kg, the world market price plus tariffs will be approximately €72,5-75 as shown in Figure 3.1. This is the upper constraint on the price which EU producers can charge. Thus, even in the absence of imports, the world market price has an influence on the price within the Union. As is evident from Table 5.1 and Appendix 4 market prices within the EU are consistently close to the world market price plus tariffs.

## 5.2 Two or more firms in the market with transport costs

Since trade is free within the EU, there is scope for competition in all the member states irrespective of the number of national producers. Denmark, for instance, has only one domestic producer but faces, at least potentially, competition from firms based in other member states because of the geographical proximity of e.g. the German market. However, since cross-border trade is very limited, markets with one producer are in effect monopolies or near-

monopolies. Not all markets within the European Union are monopolies or near-monopolies. For example, France has fifteen quota holders, Italy has five and Belgium has three. Yet the prices we observe in these markets are not lower than those in Member States with only one producer. In Section 5.2.1 we analyse the impact of transport costs on the competition in any market, and in Section 5.2.2 we calibrate the transport cost model to a typical EU sugar market.

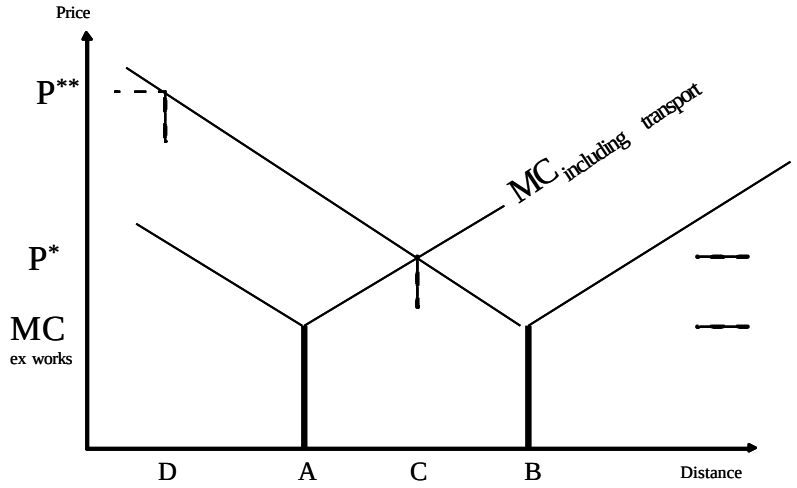
### *A transport cost model*

For products where transport costs are substantial, prices can sometimes be explained by distance to other producers.

We construct a simple model where two firms are located at a certain distance from each other, for reasons outlined in Section 4. We find that the further away a buyer is located from a competitor's plant, the higher the price the nearest supplier can charge.

For simplicity, we assume that both firms have the same marginal cost and transport cost. One firm is located at A and the other at B and buyers may be located anywhere along the X-axis.

Figure 5.1: Marginal Cost Pricing with Transport Costs



A buyer located at C, centred right between the processing plants A and B owned by competing firms, will be charged P*, which is equal to marginal cost at the processing plant plus the transport cost. All buyers located to the left of C will buy from firm A and all buyers located to the right of C will buy from firm B.

If the firms can identify where the buyer is located, and can prevent reselling among buyers, they can charge a price higher than P* to buyer D. D is located further away from B and thus has no alternative than to pay the higher price P**, to either firm A or B. The price is determined by the transport cost to the nearest alternative supplier.

If the firms cannot identify where the buyers are located or prevent re-selling among buyers, no buyer can be charged more than P*.

### *A numerical example from a sugar market*

A system where buyers are charged a basic price and then an additional transport cost is called base point pricing. If the situation on the European sugar market is to be described by the above transport cost model, there are a few facts to be noted. The export subsidy system determines the base point price, the lowest price at which a producer would be willing to sell. The base point price is the price that a producer can get when selling for export out of the EC, which is approx. €67. The average list prices quoted by the sugar-manufacturing firms, are €74.5 as can be seen in Table 5.1

We have looked in detail at the transport costs for sugar within Sweden. Our interviews provide an estimate of €0.020-€0.028/kg for a complete transport over the distance Malmö-Stockholm, which is approximately 600 kilometres. This translates into €0.438/100kg/100km, which is small in comparison to the price of approximately €70/100kg.

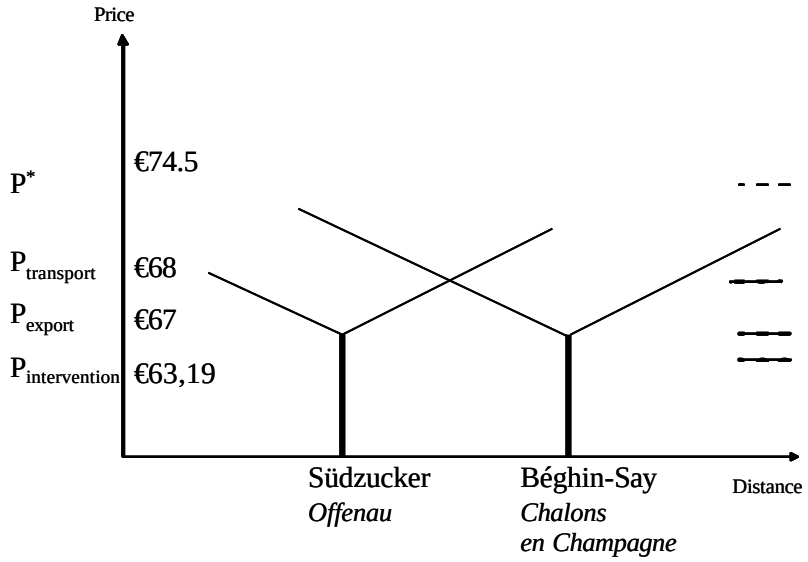
The Swedish Institute for Transport and Communication Analysis, SIKA, model transport and trade patterns for the EU. In their model they estimate transport costs for a number of goods. Their latest report provides the figure of €0.146/100kg/100km for foodstuff for the vehicle plus €0.0936/100kg/hour for the driver, which, at an average speed of 50km/h, adds up to €0.338/100kg/100km (SIKA 2002). Their calculations are based on the use of a lorry

with trailer. The costs of loading and unloading are estimated at approx. €0.2/100kg.

The EU Commission discusses the issue of transport costs in their investigation of the Südzucker/Saint Louis Sucre merger. The Commission claims that the cost of transport is a factor in deciding the price, but provides no explicit estimates of the importance of the transport cost.

Using transport costs of this magnitude in our numerical example, we adapt the model to the situation in a typical EU sugar market. P* is the observed transaction price, which we set at the average price from table 5.1, i.e. €74.5/100 kg, and the situation can be depicted as follows. In our example we choose a distance 400km, which is a typical distance between plants in continental Europe. For instance, the Südzucker processing plant in Offenau and the Béghin-Say processing plant in Chalons en Champagne are located approx. 412 kilometres apart.

Figure 5.2: A Numerical Example From the EU Sugar Markets




A consumer located halfway between the two plants will have to incur a transport cost to cover the distance of 200 km. A very safe

estimate, albeit on the high side, is that transport would cost €1.0/100 kg. Thus if the firms competed according to the transport cost model, we would expect the market price in this market to be €68 instead of the observed €74.5/100 kg.

The transport cost model above is not enough to explain the observed sugar prices, i.e. firms do not compete as much as would be expected from this model.

## 5.3 Two or more firms in the market, models of tacit collusion

The EU sugar markets are fully insulated by the tariff structure from outside competition. There is a small number of competitors in each market, seven of the Member States have only one firm which receives the entire production quota. In addition, intra-EU trade is almost non-existent. This creates grounds for suspecting collusion, either tacit, or explicit, in the form of a cartel.

Tacit collusion is a non co-operative form of collusion. It involves a restriction of output, a co-ordination of prices or market-sharing[40], in which each firm independently and willingly engages. Each of these activities leads to an increase in price from which all firms benefit.

Tacit collusion need not involve any "collusion" in the legal sense, and in particular needs no communication between the firms. It is referred to as tacit collusion only because the outcome (in terms of prices set or quantities produced, for example) may well resemble that of explicit collusion or even of an official cartel. A better term from a legal perspective might be "tacit coordination". We will use the term tacit collusion as it is the term used in the economic literature

Explicit collusion requires explicit agreements between firms regarding the cartel activities. In order for the Competition authorities or courts to be able to take legal action against firms for cartel behaviour there are high requirements on formal evidence, in the form of e.g. contracts, correspondence or other kinds of documents.

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40 Aiming at securing certain parts of the market for certain firms.

Competition authorities in several member states, and the EU Commission and national competition authorities have conducted investigations into alleged explicit collusions, and EU sugar companies have been convicted of cartel behaviour in a few cases.[41]

A large literature has evolved on the issue of tacit collusion, where Friedman (1971) and Abreu (1986) made early contributions. For an overview of the literature we refer to Martin (2002). The most important point of tacit collusion is that firms can succeed in charging a price that far exceeds marginal cost, as long as other firms in the market do the same. Tacit collusion requires repeated interaction between the firms, a price exceeding marginal cost can be sustained by using the threat of retaliation as a response to any attempt at competing, to change the present market situation. If price is the variable that is co-ordinated, or if markets are shared, it is the threat of a future price war that keeps firms at the collusive equilibrium, where prices are substantially above marginal costs. The term equilibrium refers to a situation where no single firm can gain from unilaterally changing its behaviour.

If the firms do not succeed in maintaining the tacit collusion, the market will be characterized by a competitive equilibrium where prices are equal to marginal cost plus transport costs for the highest-cost firm. Without repeated interaction between firms, the equilibrium will always be the competitive equilibrium, where the price is €68 as in Figure 5.2.

A deviation from the collusive equilibrium is defined as a small unilateral decrease in price by one firm. A deviation may be profitable if the firm can quickly steal buyers from its competitors and gain a larger share of the market. The deviation only lasts as long as it goes unnoticed by other firms in the market. However, all firms are deterred from deviating by the threat of a price war during a retaliatory period, where all firms price at marginal cost, and profits are low or zero for all firms.

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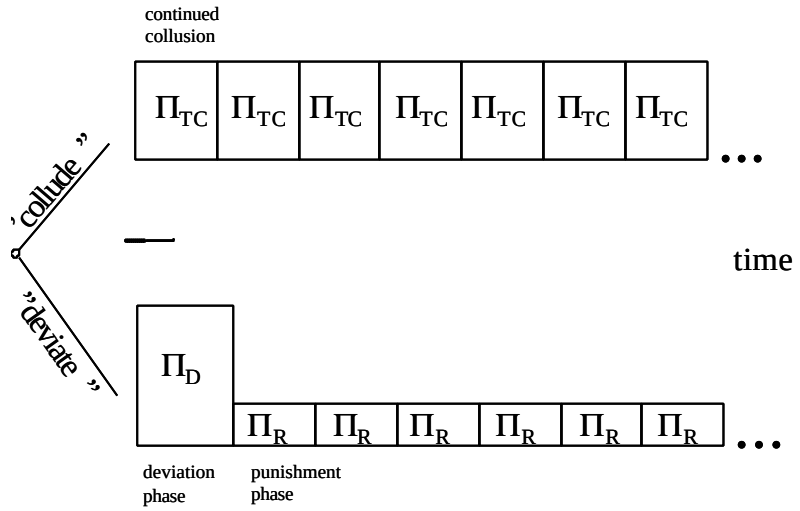
41 Resolución 426/98, Azúcar (Tribunal de Defensa de la Competencia, Spain); Joined cases 40-48, 50, 54-56, 111, 113-114/73, "Suiker Unie", [1975] ECR 1663, [1976] 1 C.M.L.R. 295, (ECJ); T-202/98, T-204/98 and T-207/98 and Tate & Lyle plc, British Sugar plc, and Napier Brown & Co. Ltd v Commission 12/7/2001 (CFI).

We denote the tacit collusion profit of the firm $\Pi_{TC}$, where the price is P*, corresponding to €74.5 in the transport cost model in Figure 5.2 above. The deviation profit is denoted as $\Pi_D$, where the deviating firm's price is slightly below P*. The market share of the deviating firm is higher because it has managed to steal some business from its competitors, who by not being aware of the deviation still price at €74.5. The slightly lower price may be outweighed by a larger market share and the deviation profit $\Pi_D$ is larger than the collusive profit $\Pi_{TC}$. The retaliatory period profit is denoted $\Pi_R$, where all firms have resorted to $P_{transport}$ [42], €68 in the transport cost model. The decision that the firm faces can be depicted as in Figure. 5.3.

Figure 5.3: Tacit Collusion, Continue to Collude or Deviate?




The sizes of the squares reflect the sizes of the respective profit. If the firm continues to collude, it will receive $\Pi_{TC}$ in every future period. If the firm deviates from the tacitly collusive agreement, it will initially make the deviation profit. The deviation profit is

42 Firms will still make a profit on those consumers located closer than halfway to the nearest competitor.

larger than the collusive profit, since the firm has stolen some business from its competitors, and its price is only slightly lower than its competitors. Eventually the deviation will be discovered and competitors will impose the retaliation, i.e. a reversion to the competitive equilibrium and $P_{transport}$. The firm has to decide whether the profits from continued collusion outweigh the short run profit from deviating.

Future profits are always discounted by some discount factor. A profit of €100 next year is valued significantly lower than €100 today. One could always deposit the "less than €100" in the bank today and receive €100 tomorrow The difference in value is determined by the *discount factor.* If firms face no risk and have free access to capital markets and can borrow at the interest rate *r*, the discount factor is equal to

$$\frac{1}{1+r}$$

If the interest rate is 5 per cent we can write the discounting as:

$$€100 * \frac{1}{1+r} = €100 * \frac{1}{1.05} = €95.2$$

By depositing €95.2 today the firm can receive €100 tomorrow thus €100 tomorrow must be worth €95.2 today!

Using the discount factor on future profits, the gains from the tacit collusion in Figure. 5.3. can be written:

$$\left(\frac{1}{1+r}\right)\Pi_{TC} + \left(\frac{1}{1+r}\right)^2 \Pi_{TC} + \left(\frac{1}{1+r}\right)^3 \Pi_{TC} + \ldots.$$

The gains from deviating can be written:

$$\left(\frac{1}{1+r}\right)\Pi_{D} + \left(\frac{1}{1+r}\right)^2 \Pi_{R} + \left(\frac{1}{1+r}\right)^3 \Pi_{R} + \ldots$$

Firms will choose, as depicted in Figure 5.3, to continue to collude if the profits from continued collusion is larger than the profit from deviating:

$$\left(\frac{1}{1+r}\right)\Pi_{TC}+\left(\frac{1}{1+r}\right)^2\Pi_{TC}+\left(\frac{1}{1+r}\right)^3\Pi_{TC}+\ldots\geq$$
$$\left(\frac{1}{1+r}\right)\Pi_{D}+\left(\frac{1}{1+r}\right)^2\Pi_{R}+\left(\frac{1}{1+r}\right)^3\Pi_{R}+\ldots$$

which simplifies to:

$$\frac{1}{r}\Pi_{TC}\geq\left(\frac{1}{1+r}\right)\Pi_{D}+\frac{1}{r}\left(\frac{1}{1+r}\right)\Pi_{R}=$$
$$\frac{1+r}{r}\Pi_{TC}\geq\Pi_{D}+\frac{1}{r}\Pi_{R}$$

For tacit collusion to be an equilibrium, the profits from collusion must be at least as large as the profits from deviating. Using the condition above, we see that tacit collusion is sustainable if the discount factor is large enough (a small $r$), i.e. if future profits are valued high enough. In particular, if $r$ approaches zero and the retaliatory profit is zero, tacit collusion can always be sustained.

The decision whether to continue colluding depends on $\Pi_{TC},\Pi_{D},\Pi_{R}$ and $r$. Tacit collusion is easier to sustain if $r$ is low, if $\Pi_{TC}$ is high, if $\Pi_{D}$ and $\Pi_{TC}$ are low.

In our numerical example, the competitive equilibrium is where firms charge a price equal to the export price plus transport cost, €68, $P_{transport}$ in Figure 5.2. The tacitly collusive equilibrium is where firms charge a price equal to P*,€74.5. The highest possible P* is restricted by the tariff structure and will be just below the world market price plus tariff.

€74.5 can be sustained by the threat of returning to the competitive equilibrium €68 if any firm deviates from the tacitly collusive equilibrium where price is equal to €74.5. A deviation would be to lower the price unilaterally, marginally below €74.5, and steal business from other firms. The price war during the retaliatory pe-

riod means charging prices at €68 and results in considerably smaller profits for all firms.

In the transport cost model above under tacit collusion, the distance to any particular buyer will determine which firm will be the supplier. For example, Südzucker will supply all buyers located to the left of Südzucker, and all buyers to the right of Béghin-Say will be supplied by Béghin-Say. The firms in effect geographically divide the market, market sharing. A deviation from a collusive equilibrium in this model means entering another firm's market, by stealing some of the other firm's buyers.

In the collusive equilibrium, markets will be very static, so that firms will sell in their local geographical market, and there will be little or no switching of suppliers.

*"producers are not willing to let buyers switch supplier because they do not want to upset the marketplace"*

Large industrial buyer of sugar

Even if firms succeed in sustaining collusion, price wars may occur as the result of changes in demand conditions. A sudden drop in demand may be misinterpreted as a deviation by the firm which has lost business unexpectedly, a business stealing price cut by a competitor, see e.g. Green and Porter (1984). Rotemberg and Saloner (1986) constructs a model where tacit collusion cannot be sustained in a boom since the temptation from cheating is too large when demand is high. Therefore, even in markets where tacit collusion prevails, periods of drastically lower prices may be observed i.e. a price war. In the EU sugar industry, there have been examples of behaviour that can only be described by a model of imperfect competition. There was a price war in Britain during 1986 which started as a response from British Sugar to an attempt by Napier Brown at entering the British retail sugar market.

### *Factors facilitating tacit collusion*

In the previous section we assumed that firms could collude. This is not always the case. There are a number of factors that affect

firms' ability to sustain the tacit collusion.[43] In this Section we will discuss a number of factors that affect ability to sustain tacit collusion, both with respect to the general implications of each factor, and with respect to the EU sugar industry in particular. We will specifically address the impact of the CMO Sugar on each of the factors. None of the factors alone is sufficient for the existence of tacit collusion, nor can it be claimed that any factor is necessary. However, several studies have shown the importance of these factors, see e.g. Dick (1990).

Before discussing factors that make tacit collusion more or less likely we must determine whether it is at all possible for firms to deviate. If there are no possibilities to expand and steal business from competitors, to deviate, collusion arises automatically.

Absence of excess capacity, or inability to expand, means that the deviating firm would not have the capacity to meet the large increase in quantities resulting from its price cut. Therefore the firm has no incentive to try to expand its market, deviate from the collusive price, and tacit collusion is unavoidable.

A firm's maximum capacity for supplying the EU sugar market is given by it's A- and B-quota. C -ugar cannot be sold within the EU. Only firms that export A- or B-sugar have any possibilities to expand their sales on the EU market.

Firms that currently do not fill their assigned production quotas of A and B sugar have a high marginal cost and do not find production profitable at the current market price within the EU. These firms do not have the incentive to increase production in order to sell at a deviation price lower than the collusive price €74.5 in our example.

A firm which exports some of its A or B sugar could choose to expand within the Union and sell that sugar on the EU market. The figures on exports of A and B sugar are not available at the firm level. Aggregate EU exports of A and B sugar amount to 2.9 million tonnes (yearly average 1996-1999), which can be compared to the total consumption of 12.7 million tonnes. As noted earlier only firms located in Belgium, Denmark, France, Germany, Italy and

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[43] The arguments in this section are based on Tirole (1988), Carlton and Perloff (2000) and Martin (2002).

United Kingdom have significant exports of quota sugar. The ability to profitably expand production is limited to firms located in these Member States.

We conclude that there is scope for competition within these markets. Some firms have the ability to expand their sales within the Union. Whether tacit collusion will destroy the competition depends on a number of factors that will be addressed in the following.

*Market concentration*

Tacit collusion is more likely in a highly concentrated market, $\Pi_C$ is larger. A high degree of concentration makes it easier to find out who has deviated in order to retaliate, $\Pi_D$ is made smaller. Coordination on a collusive price is also easier with fewer firms in the market.

The sugar industry is highly concentrated on all EU markets. The CMO Sugar has maintained production in regions where there otherwise would have been no cultivation of beet. The total number of firms in the EU is thus higher than would have been the case in the absence of the CMO. The production of beet sugar by firms in Finland and Portugal would probably not be profitable without the CMO.

On the other hand, the CMO Sugar by assigning quotas on a national level has consolidated the division of national markets. Thus, on a national level, since quotas are not tradable between Member States and are fixed, the CMO Sugarmaintains the high level of concentration. Without the CMO Sugar quota system, it would be possible to decrease concentration on the national level. The overall effect of the CMO Sugar on concentration is indeterminate.

*Entry, and barriers to entry*

Markets with supernormal profits will inevitably attract entry. Thus, entry, or even potential entry, will weaken the possibilities for tacit collusion by making future collusive profit $\Pi_{TC}$ uncertain.

In the EU sugar markets, entry could encompass both the establishment of new firms within the EU, imports from producers located elsewhere and the entry of substitute products. Since a production quota is necessary for production within the EU, and quotas are reallocated only to a very limited extent entry into the market for sugar processing is made more or less impossible by the CMO Sugar.

Given the tariff structure, the price of imported non-preferential sugar will always be higher than the EU market price. Entry of imported non-preferential sugar is made impossible by the CMO Sugar.

The CMO Sugarhas limited the possibility of entry of the substitutable product isoglucose, by restricting its production through quotas. Thus the best substitute product has been restricted from expansion by the CMO Sugar.

*Transparency*

If firms can easily obtain data on their competitors' prices or which suppliers buyers use, tacit collusion is easier to sustain. More, and faster information, makes it easier to detect deviation, i.e. it shortens the deviation phase thus reducing the profit $\Pi_D$ from deviation.

In the sugar markets, firms have little or no access to the prices buyers are offered by other sugar-producing firms. However, if a buyer switches supplier, as a result of a better offer, there is only one or a few alternative firms to which the buyer may have turned, which enables the firms to easily deduce where their lost business has gone. The CMO Sugar has made it easier to separate markets geographically, market sharing, and thereby reduces the number of alternative suppliers.

*"The strategy of the suppliers is that if you do not touch my market, I will not touch yours."*

Industrial buyer of sugar

The EU Commission writes, in its investigation of Südzucker/Saint Louis Sucre that "[the quota system] trägt dazu bei, die Aufteilung in nationale Märkte zu konsolidieren" i.e., the quota system con-

tributes to the consolidation of national markets. The CMO Sugar has increased transparency in the markets by facilitating geographical market sharing.

*Retaliatory mechanisms*

For tacit collusion to be sustainable, it is necessary that threats of retaliation are credible, i.e. there must exist some effective retaliatory mechanism, which yields a low $\Pi_R$. If firms are active in several markets, geographical or product, a deviation in one market may evoke a response in all markets. The ability to retaliate in several markets strengthens tacit collusion.

Following our reasoning in relation to the possibility of deviation, we note that the subsidized export of quota sugar, A- and B-quota, amounts to 2.9 million tons whereas total EU consumption is approx. 12.7 million tons. Demand is highly inelastic, a price decrease down to the competitive equilibrium would lead to an increase in consumption of only approx. 0.25 million tons.[44] By reducing exports of A- and B-quota sugar, firms can easily meet the demand at the lower price level.

If one firm deviates, it is thus possible for the other firms to retaliate by starting a price war, where price is equal to €68 at the competitive equilibrium.

An indication that firms are aware of how capacity may be used to deter defection is that the EU Commission, in its recent clearing of the Südzucker/ Saint Louis Sucre merger, is concerned that Südzucker, by acquiring SLS, may increase its ability to punish an attempt by French manufacturers to enter the German market.[45] The retaliation would consist of Südzucker entering the French market on a larger scale as a response to any French attempt to enter the South German market.

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[44] Calculations are based on an average market price of €74-75, a competitive equilibrium price of €67-68 and a linear demand curve between the present equilibrium and the competitive.

[45] Comp/M.2530, Commission clears acquisition of Saint Louis Sucre by Südzucker subject to commitments, Brussels 20 December 2001

The CMO Sugar assigns A- and B-quotas that are larger than domestic consumption. The subsidized exported quantities of A- and B-sugar is excess capacity ready to be used in the EU. By assigning quotas in excess of consumption, the CMO Sugar has in effect provided an effective retaliatory mechanism.

We have to note that the mechanisms for deviation, discussed above, and retaliation are not equivalent. In the case of deviation it is the individual firm which must have access to capacity to fill the increased sales from its unilateral price cut. In the case of retaliation, the non-deviating firms as a group must have the ability to drive prices down by expanding sales within the EU.

*Homogenous products*

If different firms offer similar, homogenous, products, buyers are willing to switch supplier even in response to a small price difference between firms. If products are homogenous, the gain from deviation $\Pi_D$ is larger and tacit collusion will be harder to sustain. If products are differentiated, buyers regard the alternative products as poorer substitutes. A larger price cut will be necessary for buyers to switch, which reduces the profit from deviation $\Pi_D$, and tacit collusion will be easier to sustain.

As discussed in Section 4, sugar is a homogenous product. Our investigations show that most buyers view suppliers' products as near perfect substitutes and would switch sugar supplier to take advantage of even a marginally lower price. The homogeneity of the products offered by different firms suggests that tacit collusion is less likely than if the products were differentiated. Even though a small price decrease would induce a large number of buyers to switch, the firm's ability to supply buyers is determined by the quota. No firm can sell more on the EU market than its quota of A- and B-sugar. The CMO has had no effect on the homogeneity of the product sugar.

*Stable demand*

If demand is unpredictable, sales may change unexpectedly and firms may erroneously attribute this to a deviation from the collusive price by a competitor. A stable and predictable demand minimizes the risk of this type of error and thus facilitates collusion.

Since 1990 consumption within the EU has been more or less stable at approximately 12.7 million tonnes per year (NEI). Our investigations indicate that demand is stable, there are no seasonal changes and a small constant downward trend in aggregate demand. The CMO Sugar has had the effect of cushioning the volatility of world market prices, and total quantity sold within the EU.

*Product development*

When products can be differentiated or quality can be increased, this introduces one more variable by which firms can compete. In such a product market, a firm can steal business even without lowering price by offering higher quality at the same price as its competitors. The ability to deviate without being detected increases i.e. $\Pi_D$ increases.

There is no product development concerning white sugar, legally defined as 99.5% sucrose.

*Concentration on the buyer side*

When buyers are few and large, the scope for negotiations and thus the ability to offer secret discounts from the collusive price is increased. When buyers are many and small, negotiations are costlier and discounts are less likely to remain a secret between the parties. The risk of being detected when deviating is smaller, $\Pi_D$ is larger when buyers are few and large, tacit collusion is thus less likely.

The ability of large sophisticated buyers to defeat collusive behaviour may be overrated,[46] many successful explicit cartels have sold to very large buyers, e.g. among the buyers from the citric acid cartel in the United States were Coca-Cola and Procter and Gamble.

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[46] Kolasky, William, Deputy Assistant Attorney General, Department of Justice, USA speech on April 24 2002.

*Conclusions on CMO Sugar and the scope for tacit collusion on the EU sugar markets*

All factors above have to be weighted in an overall assessment of the likelihood of tacit collusion. The most important factors are concentration, entry barriers, transparency and retaliatory mechanisms.

The CMO Sugar has through the quota system consolidated the national markets and facilitated market sharing. Tacit collusion is easier to sustain when markets are geographically separated as deviations are more easily detected. The separation of markets keeps concentration at a very high level on most EU sugar markets.

Entry, or the threat of entry, is the single factor that most effectively can restrain firms from using tacit collusion. The CMO Sugar has prohibited any form of entry and thus gravely enhanced the possibility for tacit collusion.

In its recent judgement on the EU Commission's prohibition of the Airtours/First Choice, the Court of First Instance emphasised the need for credible and viable retaliatory mechanisms as a necessary condition for the existence of tacit collusion. The firms in the EU sugar industry are exporting large quantities which could easily be sold within the EU as a retaliation to any attempt by a firm to expand its sales within the EU.

Figure. 5.4: Relationship Between Market Conditions and Likelihood of Coordination, and the Effect of the CMO Sugar


Based on Europe Economics (2001)

The EU Sugar markets, under the CMO Sugar, are highly conducive to tacit collusion. The geographical separation of markets minimises the need for communication between the firms. A number of possible minor reforms could make the tacit collusion harder to sustain. Free trade would undoubtedly break any tacitly collusive behaviour and bring prices to the level of the world market, such a profound change is not realistic in the short run however.

## 5.4 The effects of a number of policy changes.

As concluded in the preceding analysis, the CMO Sugar has the effect of increasing the likelihood of tacit collusion between sugar firms in the EU. Tacit collusion increases price above what could be the competitive price under the CMO Sugar, €68, which negatively affects all buyers of sugar and products containing sugar.

Beet growers receive only their share of the intervention price regardless of the market prices, while the profits generated by the higher price accrue to the sugar processors. Profits generated by some firms are partially captured by beet growers through ownership of processors. This aspect will be disregarded in the following discussion.

If the CMO Sugar were to be reformed, this could potentially affect the likelihood of tacit collusion. A number of alternative policy changes will therefore be discussed using the model of tacit collusion. By determining the effect of a given reform proposal on the factors facilitating collusion, its effect on the likelihood of tacit collusion can be established. The effects of a reform will also be analysed with respect to the aims of the CAP, particularly the aim of securing a fair living standard for the agricultural community.

It will be assumed that a reform of the CMO Sugar would not affect the following factors: stable demand, low product development, and product homogeneity.

The alternatives for reform of the CMO Sugar, which will be discussed are a reduction of import tariffs, a reduction of quotas, reduction of export subsidies, tradability of quotas, a reduced intervention price and non-restricted production of HFS. Each proposal for policy change is discussed keeping all other factors constant.

*A reduction of import tariffs*

We assume that a reduction of the import tariff is such that the world market price plus tariff would still be higher than the intervention price. If the import price were to fall below the intervention price, selling for intervention would be the most profitable alternative for sugar producers. As a result, all sugar produced under the A- and B-quotas would be offered to the intervention agencies, leading to a huge increase in the costs of financing the CMO Sugar. For this reason we do not consider such a large tariff reduction a viable reform alternative.

If EU prices were to exceed the world market price plus the new tariff, sugar buyers would switch to producers located outside the EU. A reduction in import tariffs, such that import price is still above intervention price, would decrease the upper limit to which producers located within the EU could increase price by tacit collusion. The sugar price within the Union would be reduced even if the firms maintain the tacit collusion.

With a lower collusive price, the profits which can be achieved under tacit collusion are smaller. If we use the notation from the model in Section 5.3, $\Pi_{TC}$ is smaller. However, the profits from deviation, $\Pi_D$, when price is set just below the collusive price, will also be smaller. The combined effect is such that it will always be harder to sustain tacit collusion. We know from above that tacit collusion can be sustained if:

$$\frac{1+r}{r}\Pi_{TC} \geq \Pi_D + \frac{1}{r}\Pi_R$$

If $\Pi_{TC}$ and $\Pi_D$, which are both determined by the import price, decrease by the same factor[47] tacit collusion will be harder to sustain (as long as $\Pi_R > 0$, if $\Pi_R = 0$, the incentives to collude are unaffected by the scale of $\Pi_{TC}$ and $\Pi_D$)

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[47] The increased quantities that will be sold within the union since the price is lowered do affect $\Pi_{TC}$ but the effect is so small that we disregard it.

This reform would have no effect on concentration or the possibilities for entry into the market. The transparency and retaliatory mechanisms are also unaffected by a lowering of the tariff.

The effect of an import tariff reduction is a decrease in sugar prices even if tacit collusion is sustained. The reform may still result in a collusive, but lower sugar price.

The likelihood of collusion is also decreased, tacit collusion may break down which reduces prices to the competitive price of €68.

Beet growers would be affected to the extent that the firms that they deliver to decrease production as a result of the price decrease. This may be the case in the highest cost regions of the EU. The beet price will remain unchanged.

*Reduction of quotas*

A reduction in the total quota for sugar production within the EU would reduce the total quantity of A- and B-sugar produced. The quantities of C-sugar will be unaffected.

Given that it is more profitable to sell sugar on the EU market than to export it, the reduction in quota will reduce the quantities produced for export. Without any assumptions regarding the distribution of quota cuts, the ability to deviate, and the ability to retaliate against a deviating firm, by shifting sugar from export into the home market may be reduced.

A simplifying assumption is that all Member States will have the same proportional reduction in quotas. The distribution of quota cuts between firms may be organised in different ways.

If we assume that all firms within the national quota get a proportional reduction in their quotas, concentration will not be affected. $\Pi_{TC}$ will be slightly reduced since quantities exported at a profit will be smaller. $\Pi_D$ may be smaller if the firms exported excess capacity under the new quota is not enough to fill the increased quantity it can sell during the deviation phase. This effect makes tacit collusion easier to sustain.

Smaller quotas and excess capacity could in theory affect $\Pi_R$, the retaliatory profit, but the quantities required (0.25 million tonnes) to reduce the price to the competitive equilibrium of €68 are so small in comparison to exports (2.9 million tonnes ) that we disregard this effect. A large quota cut is required to have any effect on the firms' ability to retaliate.

Given the assumption of proportional reductions for all firms, the effects for tacit collusion are indeterminate.

If the quotas are reduced in such a way that it results in fewer quota holders on a national level, concentration, and $\Pi_{TC}$ , will increase since the remaining quota holders can increase their sales within the union. As a result, tacit collusion will be facilitated. It will be easier to determine to which competitor business has been lost. A deviation will be detected faster, thus $\Pi_D$ will be smaller.

A quota reduction will have no effect on the possibility of entering the market, since entry requires an increase in quotas.

The effect of the reform on beet growers would be a reduction in income resulting from a decrease in the quantity of beet produced.

### *Reduction of export subsidies*

A reduction of export subsidies would decrease the amount of A- and B-sugar sold on the world market. It is assumed that the lower export subsidy is such that exporting is still more profitable than intervention.

The smaller quantities exported with subsidies means that production levies can be lowered, which means a redistribution from firms which export relatively much to those which export less.

The new, lower, export subsidy will have different effects both for sugar firms with marginal costs of production exceeding the world price plus the new export subsidy and also for firms with a marginal cost below the new export price. We denote these firms as high cost and low cost firms respectively.

At first sight it appears as if reduced profits from exports could increase incentives for firms to deviate from the tacit collusion by selling larger quantities within the EU. However, due to production technology, total quantities of production are determined (beet is sown in March-April and harvested in September-November), and publicly known at least five months in advance. Competitors will readily observe if a firm produces quantities, which exceed what can be sold under its share of the tacit collusion within the EU.

A high cost firm cannot profitably sell this sugar for export, competitors will conclude that the high cost firm intends to deviate by selling these quantities within the EU at a price slightly below market price of €74.5. Other firms will prepare and retaliate immediately and there will be no profits from the planned deviation. High cost firms understand this mechanism and will reduce production by exactly the quantities that were formerly exported.

A low cost firm can still profitably sell the same quantities for export. Therefore, competitors cannot use sown quantities as an indication of whether a firm intends to deviate.

Collusive profits, $\Pi_{TC}$, are lower since profits from quantities sold for export are lower. During the retaliatory period, the entire quantity is sold at the price determined by the export subsidy scheme, today €68, thus $\Pi_R$ will be substantially lowered. The effect on $\Pi_{TC}$ is smaller than the effect on $\Pi_R$ since the export subsidies only affect a small fraction of $\Pi_{TC}$ but the entire $\Pi_R$. $\Pi_D$ will be unaffected. For low cost firms, the incentives to deviate from the collusive equilibrium are smaller with the new lower export subsidy.

It is likely that the majority of sugar producing firms within the EU belong to the low cost category, thus a reduction in export subsidies will have the effect of increasing the incentives for tacit collusion. This reform will not affect concentration, transparency nor entry barriers. The net effect from a reduction in export subsidies will thus be a greater incentive to use tacit collusion.

A reform of this kind may affect the incomes of beet growers in regions with the highest cost of production. Even though beet prices

are unchanged, the use of quotas by the highest cost producers may be reduced.

*Tradability of quotas*

If quotas were made tradable between Member States within the EU, quota production would be relocated, either by firms in the most productive regions purchasing additional quotas or by the purchase of, or construction of, processing plants in the most productive regions by the present quota holders. These firms will then reduce production in the current location.

A quota has a higher value to a firm with low costs of production since it yields higher profits. A firm with a low cost of production can offer a price for the quota which a producer with higher production costs will accept. A firm with high production costs can realise higher profits on its own by relocating its production to a region where conditions are more favourable, thereby reducing production costs.

It is likely that production of sugar would be concentrated in areas in the EU with the lowest production costs.

The number of plants in any area is determined by the optimal plant size. However, firm size is more difficult to determine. From the model above we cannot determine the number of processing plants owned by a particular firm. Tradability of quotas among firms could both decrease and increase the number of firms on a given market. The effect of such a reform on transparency depends on the effect it has on concentration. As with concentration, transparency could both decrease and increase.

Tradability of quotas has an effect on entry barriers, since it is possible for any firm to purchase a quota and start sugar production. If entry is free, an entrant can capture some of the excess profits without cost, thus entry is attractive. When new firms enter, the collusive profits, $\Pi_{TC}$, decreases and collusion is threatened. If entry has to be purchased, as in the case of quotas, entry will only take place if the expected profits are higher than the price of entry. The price of a quota will be determined by the highest bidder. Given that the market is characterised by tacit collusion, the low cost in-

cumbent firms already present in the market, will place the highest bid for quota rights regardless of what will happen.

If entry does not cause the tacit collusion to break down, the incumbents are willing to pay the present value of the collusive profits it can gain from an extra quota, as are entrants. Entry may take place but it will not affect market prices.

If entry were to cause the tacit collusion to break down, the incumbents would be willing to pay more than the present value of the collusive profits they can gain from the extra quota, since preventing entry means they can retain the collusive profits on their existing quantity.

We conclude that the possibility of entry through purchase of quotas will have no effect on tacit collusion through entry, or market prices. The effects on concentration from relocation of incumbent firms and transparency cannot be determined and their effect on tacit collusion is undetermined.

In markets where production costs are high, imports from other Member States will replace production. With tradable quotas, intra-EU trade would increase substantially. It is likely that the reallocation of production will have an effect on the geographical division of markets. If all firms are located in the same area, the division of other regions between firms is not as easily determined. Since sales within the Union are more profitable than exports, it is likely that firms that are exporters will seek to increase their sales, and thus their geographical market, within the EU. The geographical division of markets, market sharing, is more difficult to agree on, and tacit collusion may be harder to sustain.

If tradability of quotas leads to a lower degree of concentration, the reform would reduce the ability to sustain tacit collusion, both through reduction of collusive profits and by lessened ability to divide markets among firms. If tradability leads to a higher degree of concentration, an increase in collusive profits will counteract a lessened ability to divide markets among firms.

The beet growers' incomes may be increased. Growers situated where beet growing is favourable would produce the same quantity or more, and receive the same price. A grower situated where beet growing is less favourable will sell his/her beet production quota

and receive a price between its present value for beet growing in the unfavourable location and its present value for beet growing in the favourable location. The reallocations of beet growing are already taking place within Member States where beet quotas are tradable.

*Reduced intervention price*

A reduction in the intervention price does have some effect on factors facilitating tacit collusion. Since no sugar is sold to intervention, the intervention price is only relevant as the base for calculating the export price. It would affect the retaliatory mechanism. The competitive price, the intervention price plus transport costs, would decrease, and thus the price during the retaliatory period would be lower, $\Pi_R$ is lower. More severe retaliation makes tacit collusion easier to sustain.

Since it is the import price, which provides the upper limit on the collusive price, and not the intervention price, prices within the EU would be unchanged. Only if a reduced intervention price is combined with a reduction in import tariffs would collusive prices decrease.

A decrease in the intervention price would have no effect on concentration, transparency or entry.

A reduction in the intervention price would make tacit collusion easier to sustain and would not reduce the market prices.

We assume that the basic beet price is reduced in proportion to the intervention price. If a reduction in intervention price were accompanied by full direct compensation to growers, their incomes would not be affected. Meanwhile, sugar producers would have a decrease in input costs at unchanged output price, and an increase in profits.

*Non-restricted production of HFS*

The alternative of non-restricted production of HFS is evaluated under two conditions. Firstly, it is assumed that the import tariffs for HFS are maintained. Secondly, abolition of import tariffs for HFS is analysed. In both cases, if production of HFS were not re-

stricted by a quota, its substitutability for sugar would depend on its price relative to sugar.

The price of HFS in the EU, as shown in Section 4 is lower than the sugar price. Consequently, buyers would, in situations where sugar and HFS were technically substitutable, switch to HFS. This substitution would enable HFS producers to enter the market, which reduces $\Pi_{TC}$ and thus the possibilities for tacit collusion. With new HFS producers in the market, concentration and transparency will decrease. The ability to retaliate is unaffected.

The extent to which sugar would be replaced by HFS in total consumption depends on its substitutability in both industrial and household consumption. Its substitutability in industrial consumption depends on the size of the industries in which HFS is technically substitutable relative to all sugar using industries. Given that HFS cannot substitute for sugar in household consumption, the household share of total sugar consumption, currently 30 per cent, would not be substituted.

HFS can enter the market for sugar for industrial use. Entry of new competitors, decreased concentration and transparency suggests that tacit collusion will be difficult to sustain. We would expect prices to buyers that can easily switch to fall to the competitive price for HFS produced in the EU.

If the competitive price for HFS were lower than the competitive price for sugar, all sugar produced in the EU in excess of demand would be offered to the intervention agencies.[48] Producers with marginal costs exceeding intervention price would cease to produce sugar. The intervention purchases would significantly increase the cost of financing the CMO Sugar. Unrestricted production of HFS without further reform of the intervention system would increase the cost of the CMO Sugar by more than €1 billion.[49]

If the reform included removal of import tariffs on HFS, it would imply even lower market prices for HFS on the market for sugar for industrial use. Since production costs of HFS are about 50 per cent

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48 Such large quantities cannot be exported with subsidies in compliance with the URAA

49 Assuming that 25 % of the sugar for industrial use (70% of all sugar consumed in the EU) were purchased by intervention agencies the sum is: 12.7 million tons $*$ 0.7 $*$ 0.25 $*$ 631.90

lower in the US than in the EU, imported HFS could be sold at half the price.

The reform may affect beet growers' income. The sugar sold to intervention agencies will yield the same income as before. However, if high cost producers reduce production; growers supplying those firms will be able to sell smaller quantities.

### *Concluding comments regarding policy changes*

Of the reform alternatives discussed above, we note that a reduction of import tariffs or introducing tradability of quotas will make tacit collusion harder to sustain. Non-restricted production of HFS would make tacit collusion very difficult to sustain in markets where HFS is a substitute.

The effect of a reduction in quotas is indeterminate. A reduction in the intervention price or export subsidies would have the same effect as long as the export price is based on the intervention price. A reduction in the intervention price or export subsidies would make collusion easier to sustain.

Of the reform alternatives that reduce the firms' ability to sustain tacit collusion, only a reduction in import tariffs has the effect that it will also lower the collusive price if collusion is sustained. We summarise our findings in Table 5.3.

Table 5.3: Effects of Reform Alternatives

| | Firms' ability to sustain tacit collusion | Effects on the market price if tacit collusion is sustained |
|---|---|---|
| Import tariff reduction | | |
| Quota reduction | - | |
| Reduced export subsidies | | |
| Tradability of quotas | | |
| Reduced intervention price | | |
| Non-restricted HFS | | |

Of particular interest is that a reduction in export subsidies or intervention price would make collusion easier to sustain. Thus, tacit collusion will reign and market prices under collusion will be unchanged. This outcome is contrary to what would be expected in the absence of collusion. This example shows that depending on the mode of competition on the market, a reform alternative such as lowering the intervention price may actually harm competition.

Introducing non-restricted production of HFS while the other components of the CMO Sugar remain would be very expensive.

A reduction in production quotas or an uncompensated reduction in the intervention price will reduce beet growers' incomes. A reduction in non-restricted production of HFS may reduce income for growers in regions with high costs of production. The same holds for a reduction in export subsidies, but this reduces the cost of sugar exports, such a reduction could then be used to compensate beet growers.

The discussion above shows that given the competition situation in the EU sugar market, the proposals studied for reforming the CMO Sugar would have very different, and in some cases unexpected, effects on the market prices and on beet grower incomes.

# 6 Conclusions

When a market is covered by the Common Agricultural Policy, the EC competition rules do not necessarily apply to anti-competitive agreements between undertakings. The intervention price and quota system under CMO Sugar has in principle such anti-competitive features which since they are incorporated into the CMO Sugar cannot be tackled by either national or EC competition law.

Under the Common Market Organisation for Sugar, prices can move in a range between the subsidised export price (€67, which producers can always receive) and the price of imports (world market price plus tariffs, approx. €75 depending on the world market price). Under normal forces of competition, prices would be driven down to the export price. However, the prices we observe in all EU markets are always close to the price of imports.

It has been argued that the price level can be explained by transport costs. Our study shows that transport costs are not high enough to increase prices to the level observed within the EU.

Considerable quantities of sugar are exported with EU subsidies. Why firms choose to sell for exports at €67 rather than trying to sell more within the EU, at €75, is hard to explain unless there exist implicit agreements between firms not to compete within the EU.

Firms in the EU sugar markets are able to charge prices higher than competitive prices through tacit collusion. The most important aspect of tacit collusion is that firms can succeed in charging a price that far exceeds marginal cost, as long as the other firms do the same. Tacit collusion needs no explicit communication between the firms. And thus may not necessarily be an infringement of EU or national competition rules.

By assigning fixed production quotas on a national level the CMO Sugar has consolidated the national markets, which has helped firms in separating geographical markets. Geographical separation of markets makes the monitoring of rival firms' behaviour easier.

Threat of entry is the factor that most effectively may restrict firms from sustaining tacit collusion. The CMO Sugar has blocked non-

preferential imports from outside the EU by the tariff structure. The CMO Sugar has also prevented entry by new firms by assigning quotas only to incumbent firms and when the most substitutable sweetener, isoglucose, became a viable alternative, it was incorporated into the quota system.

The substantial cost to the consumer of the CMO sugar has prompted calls for reform. Using the model of tacit collusion, we have discussed a number of proposed reform alternatives. We find that only lowered import tariffs would *both* reduce the incentives for tacit collusion *and* reduce the market price if tacit collusion prevails. None of the proposed reform alternatives would result in both these effects.

For instance, a reduction in the intervention price or export subsidies for sugar would *increase* firms' ability to sustain collusion while having *no* effect on the market price if tacit collusion prevails. A reduction in intervention price would thus give firms a larger profit margin and the beet growers would be worse off.

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# Appendices

## Appendix 1

**The full text of Article 81 prescribes as follows:**

1. The following shall be prohibited as incompatible with the common market: all agreements between undertakings, decisions by associations of undertakings and concerted practices which may affect trade between Member States and which have as their object or effect the prevention, restriction or distortion of competition within the common market, and in particular those which:

   (a) directly or indirectly fix purchase or selling prices or any other trading conditions;

   (b) limit or control production, markets, technical development, or investment;

   (c) share markets or sources of supply;

   (d) apply dissimilar conditions to equivalent transactions with other trading parties, thereby placing them at competitive disadvantage;

   (e) make the conclusion of contracts subject to the acceptance by other parties of supplementary obligations which, by their nature or according to commercial usage, have no connection with the subject of such contracts.

2. Any agreements or decisions prohibited pursuant to this Article shall be automatically void.

3. The provisions of paragraph 1 may, however, be declared inapplicable in the case of:

   - any agreement or category of agreements between undertakings;

- any decision or category of decisions by associations of undertakings;

- any concerted practice or category of concerted practices;

which contributes to improving the production or distribution of goods or to promoting technical or economical progress, while allowing customers a fair share of the resulting benefit, and which does not:

(a) impose on the undertakings concerned restrictions which are not indispensable to the attainment of these objectives;

(b) afford such undertakings the possibility of eliminating competition in respect of a substantial part of the products in question.

**The full text of Article 82 is as follows:**

Any abuse of one or more undertakings of a dominant position within the common market or in a substantial part of it shall be prohibited as incompatible with the common market in so far as it may affect trade between Member States. Such abuse may, in particular, consist in:

(a) directly or indirectly imposing unfair purchase or selling prices or unfair trading conditions;

(b) limiting production, markets or technical development to the prejudice of consumers;

(c) applying dissimilar conditions to equivalent transactions with other trading parties, thereby placing them at a competitive disadvantage;

(d) making the conclusion of contracts subject to acceptance by the other parties of supplementary obligations which, by their nature or according to commercial usage, have no connection with the subject of such contracts.

*(Extract from the consolidated version of the Treaty establishing the European Community)*

Part Three

TITLE II

## AGRICULTURE

### *Article 32* (ex Article 38)

1. The common market shall extend to agriculture and trade in agricultural products. 'Agricultural products' means the products of the soil, of stockfarming and of fisheries and products of first stage processing directly related to these products.

2. Save as otherwise provided in Articles 33 to 38, the rules laid down for the establishment of the common market shall apply to agricultural products.

3. The products subject to the provisions of Articles 33 to 38 are listed in Annex I to this Treaty.

4. The operation and development of the common market for agricultural products must be accompanied by the establishment of a common agricultural policy.

### *Article 33* (ex Article 39)

1. The objectives of the common agricultural policy shall be:

(a) to increase agricultural productivity by promoting technical progress and by ensuring the rational development of agricultural production and the optimum utilisation of the factors of production, in particular labour;

(b) thus to ensure a fair standard of living for the agricultural community, in particular by increasing the individual earnings of persons engaged in agriculture;

(c) to stabilise markets;

(d) to assure the availability of supplies;

(e) to ensure that supplies reach consumers at reasonable prices.

2. In working out the common agricultural policy and the special methods for its application, account shall be taken of:

(a) the particular nature of agricultural activity, which results from the social structure of agriculture and from structural and natural disparities between the various agricultural regions;

(b) the need to effect the appropriate adjustments by degrees;

(c) the fact that in the Member States agriculture constitutes a sector closely linked with the economy as a whole.

***Article 34*** **(ex Article 40)**

1. In order to attain the objectives set out in Article 33, a common organisation of agricultural markets shall be established.

This organisation shall take one of the following forms, depending on the product concerned:

(a) common rules on competition;

(b) compulsory coordination of the various national market organisations;

(c) a European market organisation.

2. The common organisation established in accordance with paragraph 1 may include all measures required to attain the objectives set out in Article 33, in particular regulation of prices, aids for the production and marketing of the various products, storage and carryover arrangements and common machinery for stabilising imports or exports.

The common organisation shall be limited to pursuit of the objectives set out in Article 33 and shall exclude any discrimination between producers or consumers within the Community.

Any common price policy shall be based on common criteria and uniform methods of calculation.

3. In order to enable the common organisation referred to in paragraph 1 to attain its objectives, one or more agricultural guidance and guarantee funds may be set up.

***Article 35*** **(ex Article 41)**

To enable the objectives set out in Article 33 to be attained, provision may be made within the framework of the common agricultural policy for measures such as:

(a) an effective coordination of efforts in the spheres of vocational training, of research and of the dissemination of agricultural knowledge; this may include joint financing of projects or institutions;

(b) joint measures to promote consumption of certain products.

***Article 36*** **(ex Article 42)**

The provisions of the Chapter relating to rules on competition shall apply to production of and trade in agricultural products only to the extent determined by the Council within the framework of Article 37(2) and (3) and in accordance with the procedure laid down therein, account being taken of the objectives set out in Article 33.

The Council may, in particular, authorise the granting of aid:

(a) for the protection of enterprises handicapped by structural or natural conditions;

(b) within the framework of economic development programmes.

***Article 37*** **(ex Article 43)**

1. In order to evolve the broad lines of a common agricultural policy, the Commission shall, immediately this Treaty enters into force, convene a conference of the Member States with a view to making a comparison of their agricultural policies, in particular by producing a statement of their resources and needs.

2. Having taken into account the work of the Conference provided for in paragraph 1, after consulting the Economic and Social Committee and within two years of the entry into force of this Treaty, the Commission shall submit proposals for working out and implementing the common agricultural policy, including the replacement of the national organisations by one of the forms of common organisation provided for in Article 34(1), and for implementing the measures specified in this Title.

These proposals shall take account of the interdependence of the agricultural matters mentioned in this Title.

The Council shall, on a proposal from the Commission and after consulting the European Parliament, acting by a qualified majority, make regulations, issue directives, or take decisions, without prejudice to any recommendations it may also make.

3. The Council may, acting by a qualified majority and in accordance with paragraph 2, replace the national market organisations by the common organisation provided for in Article 34(1) if:

(a) the common organisation offers Member States which are opposed to this measure and which have an organisation of their own for the production in question equivalent safeguards for the employment and standard of living of the producers concerned, account being taken of the adjustments that will be possible and the specialisation that will be needed with the passage of time;

(b) such an organisation ensures conditions for trade within the Community similar to those existing in a national market.

4. If a common organisation for certain raw materials is established before a common organisation exists for the corresponding processed products, such raw materials as are used for processed products intended for export to third countries may be imported from outside the Community.

### *Article 38* (ex Article 46)

Where in a Member State a product is subject to a national market organisation or to internal rules having equivalent effect which affect the competitive position of similar production in another

Member State, a countervailing charge shall be applied by Member States to imports of this product coming from the Member State where such organisation or rules exist, unless that State applies a countervailing charge on export.

The Commission shall fix the amount of these charges at the level required to redress the balance; it may also authorise other measures, the conditions and details of which it shall determine.

# Appendix 2

*EU and Member State production quota 2001/02 – 2005/06*

| Member State | Sugar | | Isoglucose | | Inulin syrup | |
|---|---|---|---|---|---|---|
| | A quota | B quota | A quota | B quota | A quota | B quota |
| Austria | 314 028.9 | 73 297.5 | 0.0 | 0.0 | 0.0 | 0.0 |
| Belgium | 674 905.5 | 144 906.1 | 56 150.6 | 15 441.0 | 174 218.6 | 41 028.2 |
| Denmark | 325 000.0 | 95 745.5 | 0.0 | 0.0 | 0.0 | 0.0 |
| France (total) | 2 970 359.4 | 798 632.0 | 15 747.1 | 4 098.6 | 19 847.1 | 4 674.2 |
| Germany | 2 612 913.3 | 803 982.2 | 28 643.3 | 6 745.8 | 0.0 | 0.0 |
| Greece | 288 638.0 | 28 863.8 | 10 435.0 | 2 457.5 | 0.0 | 0.0 |
| Finland | 132 806.3 | 13 280.4 | 10 792.0 | 1 079.7 | 0.0 | 0.0 |
| Ireland | 181 145.2 | 18 114.5 | 0.0 | 0.0 | 0.0 | 0.0 |
| Italy | 1 310 903.9 | 246 539.3 | 16 432.1 | 3 869.8 | 0.0 | 0.0 |
| Netherlands | 684 112.4 | 180 447.1 | 7 364.6 | 1 734.5 | 65 519.4 | 15 403.5 |
| Portugal (total) | 72 428.4 | 7 242.8 | 8 027.0 | 1 890.3 | 0.0 | 0.0 |
| Spain | 957 082.4 | 39 878.5 | 74 619.6 | 7 959.4 | 0.0 | 0.0 |
| Sweden | 334 784.2 | 33 748.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| United Kingdom | 1 035 115.4 | 103 511.5 | 21 502.0 | 5 735.3 | 0.0 | 0.0 |
| EU-15 totals | 11 894 223.3 | 2 587 919.2 | 249 713.3 | 51 011.9 | 259 585.1 | 61 105.9 |

# Appendix 3

*Product characteristics of HIS*

## Aspartame

Aspartame is the leading high intensity sweetener. It accounts for 62 per cent of world sales of HIS. The growth in demand is 15 per cent in Japan, 6 per cent in the EU and 5.5 per cent in the US (NEI (2000)). It is 100-200 times sweeter than sugar (Widenfalk et al (1998)). Aspartame is digested but because of its intense sweetness, the amounts used are small enough for it to be considered as virtually calorie-free. Aspartame is mainly used for soft drinks, confectionery, ice cream etc. It is not heat resistant, and can thus not be used in cooked or baked food. It decomposes over time and products containing aspartame have a limited shelf life. The ADI value for aspartame is 40 mg/kg body weight per day. For a person with a body weight of 60 kilos, it corresponds to 4 litres of aspartame sweetened soft drinks per day (Ilbäck et al (1997)). Its price in sugar equivalent terms was around 70 per cent of the sugar price in 1995 (NEI (2000)).

## Saccharin

Saccharin is 300-700 times sweeter than sugar (Widenfalk et al (1998)). It has a bitter aftertaste and must be blended with other sweeteners. It is not metabolised. Saccharin is the second most widely used HIS (NEI (2000)). Its main applications are pharmaceuticals, toothpaste, foods and beverages. The ADI value is 5.0 mg/ kilo body weight. The price in sugar equivalent terms is about 1 per cent of the price of sugar (ibid.).

## Cyclamate

Cyclamate is 25-30 times sweeter than sugar. It is approved as an additive in food in the EU, but not in the US or Japan. In Sweden, cyclamate may only be used in table sweeteners and not for industrial use (Widenfalk et al (1998)). Cyclamate is mainly used in beverages. It has a bitter aftertaste and is therefore often blended with saccharine.(Larsson (1996)). The ADI value is 7.0 mg/ kilo body

weight. The price of cyclamate is usually close to the price for saccharin (NEI (2000)).

Acesulfame K

Acesulfame K is 130-200 times sweeter than sugar, and used mainly for beverages and confectionery. It is not metabolised. Like saccharin, it has a bitter aftertaste and must be blended with other sweeteners (NEI (2000)). The ADI value is 9.0 mg/ kilo body weight. The price of Acesulfame-K was about 70 per cent of the sugar price in 1995 (ibid.)

Sucralose

Sucralose is a high intensity sweetener derived from sucrose. It is 600 times sweeter than sugar. It is not metabolised, and is heat resistant. Sucralose is used in, for example, beverages, chewing gum, dairy products and nutritional products. The ADI value is 15.0 mg/ kilo body weight.

# Appendix 4

*Market Prices in the Member States, June 1998-Oct. 2001*

| Member State | June -98 | Sept -98 | Dec -98 | May-99 | Sept -99 | Mar -00 | Oct -00 | Jan -01 | May-01 | Oct-01 |
|---|---|---|---|---|---|---|---|---|---|---|
| Austria | 73.1 | 73.1 | - | - | - | - | - | 73.8 | - | - |
| Belgium | - | - | - | - | - | - | - | - | - | - |
| Denmark | 70.4 | 70.5 | 70.5 | 70.6 | 70.6 | 70.5 | 70.6 | 71.7 | 71.6 | - |
| Finland | - | - | - | - | - | - | - | - | - | - |
| France | 76.4 | 76.4 | 76.4 | 77.2 | 77.2 | 77.6 | 78.0 | 78.0 | - | - |
| Germany | 71.1-72.1 | 71.1-72.1 | 71.1-72.1 | 71.6-72.6 | 71.6-72.6 | 71.6-72.6 | 71.6-72.6 | 72.9-73.9 | 72.9-73.9 | - |
| Greece | 69.8 | 72.1 | 72.1 | 73.8 | - | - | 73.2 | 73.1 | - | 73.5 |
| Ireland | 74.7 | 74.7 | 74.3 | - | 75.6 | 75.5 | 75.5 | 75.5 | - | - |
| Italy | 72.7 | 72.5 | 72.5 | 72.6 | 72.6 | 72.3 | 72.8 | - | 74.9 | 74.9 |
| Luxembourg | - | - | - | - | - | - | - | - | - | 0.0 |
| Netherlands | 72.0 | 72.0 | - | 73.2 | 73.2 | 73.2 | 73.2 | 0.0 | - | 73.5 |
| Portugal | - | 75.7 | - | - | - | 76.5 | 76.5 | 78.6 | 78.6 | 78.6 |
| Spain | 77.0 | 76.6 | - | 77.6 | 77.6 | 75.5 | 77.6 | 77.6 | 77.6 | 77.6 |
| Sweden | - | 76.6 | - | 72.8 | - | 73.0 | - | - | - | - |
| UK | 79.1 | 79.1 | 78.8 | 81.5 | 82.8 | 84.7 | 78.9 | 78.3 | 83.9 | 83.3 |

Source : NEI (2000) and CAOBISCO 2002