

## World Sugar Market – Basic Development Trends and Tendencies

M. Svatoš, M. Maitah, A. Belova

Faculty of Economics and Management, Czech University of Life Sciences in Prague, Czech Republic

### Anotace

Zpracovaný článek se věnuje problematice světové produkce cukru a cukrodárných plodin (cukrová řepa a cukrová třtina) a dále pak je analyzován i vývoj globálního obchodu s cukrem. Hlavním cílem článku je vymezit základní vývojové trendy a tendence ovlivňující současný vývoj trhu s cukrem a cukrodárnými plodinami a dále pak poukázat na proces postupného profilování světového trhu s těmito komoditami. Článek identifikuje nejvýznamnější hráče/subjekty operující na světovém trhu a to jak z pohledu produkce, tak i z pohledu obchodu. Článek rovněž identifikuje nejen nejvýznamnější subjekty globálního trhu z pohledu realizovaného objemu produkce a obchodu, ale i z pohledu disponibilních komparativních výhod a dynamiky růstu realizovaného objemu produkce a obchodu. V neposlední řadě příspěvek poukazuje na výrazné difference existující v jednotkových cenách realizovaných exportních a importních toků v případě jednotlivých zemí a regionů. Z výsledků zpracovaného článku vyplývá, že světový trh s cukrem je extrémně koncentrovaný, omezený počet subjektů lokalizovaných zejména v Latinské Americe, jihovýchodní Asii a v Evropě a Severní Americe ovládá většinu světové produkce cukrové řepy a cukrové třtiny. Dále pak z výsledků analýzy vyplývá, že produkce a export cukru jsou logicky úzce spjaty s regiony produkujícími cukrodárné plodiny z čehož opět vyplývá, že omezený počet subjektů ovládá většinu globálního trhu s cukrem – v současné době tomuto trhu dominují zejména Latinsko americké země a jihovýchodní Asie společně s Evropou.

### Klíčová slova

Cukr, cukrodárné plodiny, cukrová řepa, cukrová třtina, produkce, obchod, regiony, země, konkurenceschopnost, cena, vývoj, trend.

### Abstract

This article is devoted to the issues of the world's sugar production and cultivation of sugar crops (sugar beet and sugar cane). It also analyzes the development of the global sugar trade. The main aim of this paper is to define the basic developmental trends and tendencies that affect the current situation on the market for sugar and sugar crops and then outline a process of gradual profiling of the world markets for these commodities. The article identifies the most important players operating in the global market, both in terms of production and in terms of trade. It also identifies not only the most important subjects of the global market from the viewpoint of the realized volume of production and trade, but also in terms of available comparative advantages and growth dynamics of the realized volume of production and trade. Finally, the paper highlights the significant differences existing in unit prices of the realized export and import flows in individual countries and regions. The results of this study show clearly that the world sugar market is extremely concentrated. A narrow group of entities localized mainly in Latin America, Southeast Asia, Europe and North America controls most of the world production of sugar beet and sugar cane. Furthermore, the results of the analysis show that the production and export of sugar are logically closely linked with the regions cultivating sugar crops, which again suggests that a limited number of entities controls most of the global sugar market. Currently, this market is dominated mainly by Latin American countries and Southeast Asia together with Europe.

### Key words

Sugar, sugar crops, sugar beet, sugar cane, production, trade, regions, countries, competitiveness, price, development, trend.

## **Introduction**

Sugar is a very important commodity that contributes towards feeding the mankind. It is also a very significant component of the global food market, on which it plays an irreplaceable role. The world market for sugar and sugar-containing products is constantly evolving (Pokorná, Smutka, Pulkrábek, 2011). Its present form is being very markedly shaped especially by the process of liberalization of the world market for agricultural commodities.

In this respect it should be noted that although in recent years the markets for agricultural commodities - including sugar - have dramatically opened up, it remains clear that the trade in agricultural produce in general, and sugar in particular, represent one of the most distorted markets in the world. This is due mainly to the protectionist policies of many governments. Production and trade in sugar are also very closely linked with the policies of sustainable development (Smutka, Rumánková, Pulkrábek, 2013).

Economics of the production of and trade in sugar is greatly influenced by the developments in the area of the cultivation and trade in sugar crops. Their cultivation, trade and prices have been in recent years considerably influenced by the attitudes of many governments of the world towards the issue of renewable sources of energy. The economy of not only sugar crops cultivation, but also of the actual production of sugar and sugar-containing products are thus dramatically affected by the increase in demand for biofuels, which has been growing very dynamically in recent years.

At this point it should be mentioned that biofuel production is linked to the cultivation of both sugar beet and sugar cane - the two most important sugar crops (Smutka, Pokorná, Pulkrábek, 2011). Due to the dynamic growth of the global production of sugar and then also the production of biofuels, the worldwide cultivation of sugar crops has increased considerably in recent years. The sugar beet and sugar cane production volumes have increased by 2.5% and 2.7% per annum respectively over the past five years (FAO, 2013). The increase in the extent of cultivation was accompanied by increased production of sugar, which has reached the rate of almost 0.8% per year in the period of 2008/2009 - 2011/2012.

From the above it follows that a considerable volume of the sugar crops production was not

used for the manufacture of sugar but mainly for the needs of the biofuels production the volume of which grew during the years of 2006 - 2012 in the case of biodiesel from 1700 million to nearly 5700 million gallons, and in the case of bioethanol from 10 000 million to almost 23 000 million gallons (USDA, 2013).

Nevertheless, given the long-term evolutionary trend, a comment could be made that over time the world sugar market is a dynamically evolving quantity. In the years of 1966 - 2012 alone the worldwide sugar production had increased from 66 million tonnes to over 172 million tonnes (FAO, 2013). These figures thus show that on average the volume of the global production during the observed period rose by 2% per year.

The average annual production increase during the observed period amounted to around 2 300 thousand tons of sugar. During the same period the volume of the sugar stockpiles also increased sharply. In the years of 1966 - 2012 it increased from approximately 22 million tons to nearly 50-60 million tons (USDA, 2013). The production growth over time is constantly becoming more dynamic and over the past five years alone, ie 2008/2009 - 2012/2013, the world's sugar production has increased on average by 4.6% per year.

The sugar market is undergoing very significant changes that very dramatically modify its character. The process of liberalization and globalization of the world market (Jeniček, 2012) for agricultural and food products, which began in the nineties of the 20<sup>th</sup> century through the Uruguay Round of GATT, weakened the position of some major players on the world sugar market (notably the European Union and the USA) and, by contrast, it reinforced the production and trading positions of especially the Latin American countries and also of some countries located in Southeast Asia and the Pacific Region (Devadoss, Kropf, 1996; Poonyth, Westhoff, Womack, 2000).

The global market has been developing very dynamically in recent years, both in terms of sugar production and in terms of cultivation of sugar crops (mainly sugar cane), which, as mentioned above, are increasingly being used for the conversion into biofuels (Janda, Křišťoufek, Zilberman, 2012). Prices of sugar and sugar crops have recorded a very strong growth over the past decade. However, the character of this growth has varied in different regions of the world.

The sugar prices that were previously relatively stable had started to significantly oscillate in either direction (Rumánková, Smutka, Pulkrábek, Benesova, 2012a). After a long period of growth, it is now possible to register their gradual reduction. However, it is worth noting that as a result of the increasing use of sugar crops for non-food purposes, the growth in the global demand for sugar (owing to population growth, rising purchasing power, etc.) and the stagnation in the world's sugar stockpiles, we can expect further price increases for this key commodity (Rumánková, sadness, Pulkrábek, Benesova, 2012b).

The sugar market is very competitive (Smutka, Pokorná, Pulkrábek, 2012a). It is, therefore, not surprising that more and more profiles are constantly being created (Smutka, Pokorná, Pulkrábek, 2011b). On the other hand, it is still valid that the sugar market is greatly distorted by a number of protectionist policies pursued by a number of countries (Neundoerfer, 2011; Dillen, Demont, Tollens, 2008; Smutka, Pokorná, Pulkrábek, 2011b) such as the EU, the Commonwealth of Independent States (CIS), China etc. In the future, we can expect that the global sugar market will continue to evolve and the changes will affect not only the territorial structure of exports and imports, but also the deployment of the production capacities around the world.

## **Materials and methods**

The aim of this paper is to define the basic development trends and tendencies that have been affecting the development of the world sugar market in recent years. It also defines the major players operating in the global sugar market. In this regard, it lists the most important producers and traders of sugar and sugar crops. The article also outlines the distribution of comparative advantages in the global market and identifies the positions of the major countries and then of individual regions of the world market. Finally, the paper points out the differences existing in kilogram prices of exports and imports between individual countries and regions.

This article examines mainly the development of the worldwide production, consumption and trade in the years of 2008/2009 - 2012/2013. Emphasis is placed primarily on the period of 2012/2013. The databases of the USDA, UN Comtrade and FAOSTAT served as the primary data sources for processing individual analyses. The analyses

have been processed in metric tonnes and at current dollar prices (USD).

In terms of content, this study covers production (data are processed in the raw sugar equivalent) and trade (the analysis is processed by means of the accumulation of the commodity HS 1701 aggregation, ie refined and raw sugar together). Individual analyses are processed at the level of individual regions and countries. The availability of data in some cases was limited, thus the analysis includes results for only about 140 countries. However, based on the above mentioned reputable statistics, these countries should represent more than 95% of the world production and trade in sugar.

The overall analysis includes several parts. The basic trends were calculated for the observed period by means of chain indices, which were then averaged by the geometric mean to obtain the average increase/decrease in production, consumption and trade. The analysis of kilogram prices was carried out by simply dividing the declared value of traded goods and their mass. The competitiveness of individual countries and regions in relation to trade flows realized between a given entity and its external environment was assessed by the LFI index (includes only transactions that took place between the countries/regions and the external environment), and the RCA index (which analyzes the comparative advantages of export of a given country/region in relation to the globally implemented exports).

The analysis of the competitiveness of individual countries and regions in white sugar trade has been carried out in relation to the commodity aggregation (HS 17 - Sugar and sweets). In respect to the various above-mentioned indices, their design and interpretation follows next. The actual comparative or competitive advantage of individual entities is analyzed at the national/regional level in relation to the total volume of traded sugar on the world market via the RCA index. The concept of the RCA index itself is based on the so-called Balassa index of 1965 (Balassa, 1965).

The RCA Index of the obvious comparative advantage (comparative advantage – global/regional level

$$RCA = (X_{ij}/X_{nj})/(X_{it}/X_{nt})$$

where:

X is export

- i is the analysed country  
 j is an analysed sector of economics (industry sector or commodity)  
 n represents a group of countries or the world  
 t represents the sum of all sectors of economics or the sum of all commodities or the sum of all branches

The RCA1 index analyzes the export commodity „j“ for a country „i“ in relation to the total exports of the country and the corresponding total export of the analyzed group of countries or the whole world. A comparative advantage in such cases is demonstrated if the value of the RCA1 index is greater than 1. However, if the resulting value of the calculated index is less than 1, then we can say that the given country has a comparative disadvantage in the case of a given commodity or a group of commodities.

Competitiveness of the realized export flows in relation to the import flows (only at the level of the actually realized transactions between a given country/region and its external environment) is realized by means of the LFI index (Lafay, 1994). The LFI index makes it possible to analyze the status of each specific product within the foreign trade structure of each specific analyzed country or group of countries (Fidrmuc, Grozea-Helmenstein, Wörgötter, 1999; Burianová, Belova, 2012; Zaghini, 2005). For a given country „i“ and for each analyzed product or group of products „j“ the LFI index is defined in the following form:

$$LFI = \left( \frac{x_j^i - m_j^i}{x_j^i + m_j^i} - \frac{\sum(x_j^i - m_j^i)}{\sum(x_j^i + m_j^i)} \right) \frac{x_j^i + m_j^i}{\sum(x_j^i - m_j^i)} 100$$

where:

$x_j^i$  a  $m_j^i$  represent exports and imports of the product „j“ implemented by a country or a group of countries „i“, in relation to the rest of the world or in relation to the selected trading partner (partner country). „N“ is the number of analyzed items. A positive LFI index indicates the existence of a comparative advantage within the framework of a given analyzed traded aggregation or a group of aggregations. The higher the resulting value of the index, the higher the degree of specialization of the given country in the case of trade involving a given item or a group of items. On the other hand, a negative value of the LFI index signals the lack of specialization and subsequently also of the comparative advantage (Zaghini, 2003).

## Results and discussion

The growth of the world sugar production relies on the increase in the sugar crops cultivation. In the years 2008/2009 - 2011/2012 alone the worldwide sugar beet production reached nearly 272 million tons, with an average growth rate of production standing at about 2.5% per year. In the case of sugar cane, during the same period its production reached the level of about 1 794 million tons, and the rate of the production growth achieved an average of 2.7% per year. From these figures it is clear that the main volume of sugar crops production is made up primarily of sugar cane. While sugar beet is grown in about 50 countries (see details in Table 1), the sugar cane is cultivated in about one hundred countries (see details in Table 2).

Table 1 shows that the main producers of sugar beet are mainly Russia, France, Germany, USA, Ukraine and Turkey (i. e. Europe and North America dominate). The share of these countries in the global production is more than 60%. The highest growth rate of the production is shown particularly in the countries of Eastern Europe. In respect of sugarcane Table 2 indicates that the most significant producers are mainly Brazil, India, China and Thailand (these countries represent more than 70% of the production of sugar cane in the world). In summary, the world sugar cane production is currently dominated mainly by Latin America and Asia, with the highest growth rates shown the countries located in South America and then in Southeast Asia.

From the above it follows that the global production of sugar cane and sugar beet continues to expand over time. This growth is stimulated, among other things, by the growing demand for sugar. Its production is realized in about one hundred and twenty countries. However, the fact is that the world sugar market has long been dominated by a small group of very powerful producers that we find mainly in the Asia-Pacific Region (about 38% of the world sugar production), and then in the area of North and South Americas (26% and 8% respectively of the world sugar production) and also in Europe (about 15% of the world production).

The world market is highly concentrated. At present, it is possible to include as the most important players on the global sugar market the following countries: Brazil, India, China, Thailand, USA, EU, Mexico, Russia, Pakistan and Australia. The share of these countries in the global

Country	(1000 tonnes)	Share 2011	Growth rate GEOM	Country	(1000 tonnes)	Share 2011	Growth rate GEOM	Country	(1000 tonnes)	Share 2011	Growth rate GEOM
Colombia	21.4	0.01%	1.179	Switzerland	1828.2	0.67%	1.038	Canada	703.1	0.26%	0.980
Azerbaijan	252.9	0.09%	1.155	Europe	195652.8	72.03%	1.034	Poland	11674.2	4.30%	0.980
Russian Federation	47643.3	17.54%	1.134	France	37259.1	13.72%	1.029	Romania	660.5	0.24%	0.969
Egypt	7486.1	2.76%	1.082	Asia	37213.8	13.70%	1.027	Serbia	2821.9	1.04%	0.969
Slovakia	1160.7	0.43%	1.082	Ukraine	18740.0	6.90%	1.025	Central Asia	593.2	0.22%	0.960
Czech Republic	3898.9	1.44%	1.078	World + (Total)	271644.9	100.00%	1.025	Americas	28852.2	10.62%	0.958
Syrian	1805.2	0.66%	1.072	Lithuania	877.8	0.32%	1.024	Iraq	15.0	0.01%	0.955
Eastern Europe	89707.3	33.02%	1.068	Eastern Asia	14278.0	5.26%	1.019	Japan	3547.0	1.31%	0.953
Austria	3456.2	1.27%	1.068	Mali	4.0	0.00%	1.017	Northern America	26855.4	9.89%	0.952
Western Asia	18210.8	6.70%	1.068	Western Africa	4.0	0.00%	1.017	USA	26152.3	9.63%	0.951
Turkey	16126.5	5.94%	1.068	Western Europe	78810.5	29.01%	1.016	Spain	3966.1	1.46%	0.948
Chile	1951.1	0.72%	1.065	Netherlands	5858.0	2.16%	1.015	Southern Europe	11884.3	4.37%	0.935
South America	1996.8	0.74%	1.065	European Union	118329.7	43.56%	1.008	Italy	3548.0	1.31%	0.934
United Kingdom	8504.0	3.13%	1.060	Kyrgyzstan	158.8	0.06%	1.005	Iran	4095.7	1.51%	0.933
Northern Africa	9922.0	3.65%	1.057	Ecuador	3.9	0.00%	1.003	Southern Asia	4131.8	1.52%	0.931
Africa + (Total)	9926.0	3.65%	1.057	Finland	675.7	0.25%	1.001	Croatia	1168.0	0.43%	0.927
Net Food Importing	9982.6	3.67%	1.055	Albania	40.0	0.01%	1.000	Kazakhstan	200.4	0.07%	0.897
Belarus	4485.1	1.65%	1.055	Turkmenistan	234.0	0.09%	1.000	Hungary	856.0	0.32%	0.843
Northern Europe	15250.7	5.61%	1.049	Germany	25000.0	9.20%	0.999	Greece	324.4	0.12%	0.782
China	10731.0	3.95%	1.047	Venezuela	20.5	0.01%	0.997	Armenia	10.0	0.00%	0.780
Denmark	2700.0	0.99%	1.046	Morocco	2435.9	0.90%	0.995	Pakistan	20.9	0.01%	0.707
Afghanistan	15.2	0.01%	1.042	Moldova	588.6	0.22%	0.990	Lebanon	1.2	0.00%	0.424
Sweden	2493.2	0.92%	1.039	Belgium	5409.0	1.99%	0.985	Portugal	8.0	0.00%	0.421

Source: Data processed by author, Faostat, 2013

Table 1: World production of sugar beet, 2011.

sugar market today exceeds 76%. In particular, the shares of Brazil, India, China and Thailand, compared to the total world production, amount to amazing 51%.

The world market is concentrated not only from the point of view of production, but also in terms of the sugar trade and the possession of available stocks. The world's largest exporter with a share exceeding 45% in the period of 2012/2013 was, undoubtedly, Brazil. Other major players were then Thailand (13% of world exports), Australia (about 5.6%), India (almost 4%), Guatemala (approximately 3%). A mere five of these mentioned countries currently control 70% of world exports of sugar.

It is very interesting to track the stocks of sugar and see who deals with these stocks. It can be seen that the global ownership of this key commodity stocks is also very concentrated. The largest holders of the world's reserves of sugar are, undoubtedly, India (17.3%) and China (about 12.7%), followed

by the EU (about 8.7%), Thailand (8%) and the USA (about 5.3%). The share of these countries in the available stocks at the end of 2012 was as high as about 55%. The world production, export and supply are concentrated. The sugar consumption and its import are relatively concentrated in a similar way.

The largest importers of sugar are currently Asian countries, the Middle East and African countries. The share of these regions in imports of sugar is hovering high above 70%. A specific feature of the world sugar market is its consumption. Quite logically, the majority of sugar is consumed in Asia (more than 42% of the world consumption). The most important consumers are China with India - together about 25% of the world sugar consumption. Other major consumers are then South America, Western Europe and North America. The cumulative share of these regions on the world sugar consumption is at the level of more than 75% of global consumption.

Country	(1000 tonnes)	Share 2011	Growth rate GEOM	Country	(1000 tonnes)	Share 2011	Growth rate GEOM	Country	(1000 tonnes)	Share 2011	Growth rate GEOM
Western Asia	11.9	0.00%	1.882	Mali	360.0	0.02%	1.013	Myanmar	9400.0	0.52%	0.993
Lao PDR	1222.0	0.07%	1.394	Papua N. Guinea	335.0	0.02%	1.012	Southern Asia	411599.9	22.94%	0.992
El Salvador	9899.0	0.55%	1.189	Guadeloupe	825.0	0.05%	1.011	India	342382.0	19.08%	0.991
Cameroon	1450.0	0.08%	1.117	Nepal	2718.2	0.15%	1.011	Nigeria	1450.0	0.08%	0.991
Thailand	95950.4	5.35%	1.105	Argentina	25000.0	1.39%	1.011	Dominican R.	4644.5	0.26%	0.990
Zambia	3500.0	0.20%	1.096	Guatemala	18951.8	1.06%	1.008	USA	26655.8	1.49%	0.990
Mozambique	2800.0	0.16%	1.080	Zimbabwe	3100.0	0.17%	1.008	Northern America	26655.8	1.49%	0.990
Brazil	734006.0	40.91%	1.075	Asia + (Total)	710938.6	39.62%	1.007	Mexico	49735.3	2.77%	0.989
Cuba	15800.0	0.88%	1.073	Senegal	860.0	0.05%	1.007	Indonesia	24000.0	1.34%	0.988
Nicaragua	5937.5	0.33%	1.073	Kenya	5338.6	0.30%	1.006	Sri Lanka	729.0	0.04%	0.982
Paraguay	5339.0	0.30%	1.068	Uganda	2400.0	0.13%	1.005	Burundi	164.5	0.01%	0.981
Honduras	7818.9	0.44%	1.065	Angola	510.0	0.03%	1.005	Egypt	15765.2	0.88%	0.981
Cambodia	365.6	0.02%	1.063	China	115123.6	6.42%	1.003	Cape Verde	25.0	0.00%	0.981
South America	823067.2	45.87%	1.060	Burkina Faso	460.0	0.03%	1.003	Venezuela	8907.7	0.50%	0.979
Afghanistan	92.5	0.01%	1.057	Pakistan	55308.5	3.08%	1.003	Bolivia	5869.6	0.33%	0.979
Americas	972689.7	54.21%	1.052	Haiti	1110.0	0.06%	1.002	Martinique	206.7	0.01%	0.978
South-Eastern Asia	183203.2	10.21%	1.051	Côte d'Ivoire	1650.0	0.09%	1.002	Africa	83455.0	4.65%	0.978
Panama	2095.0	0.12%	1.050	Eastern Asia	116123.6	6.47%	1.002	EU	5.1	0.00%	0.976
Middle Africa	5285.0	0.29%	1.049	Viet Nam	17465.2	0.97%	1.001	Europe	5.1	0.00%	0.976
Oman	1.2	0.00%	1.048	American Samoa	0.0	0.00%	1.000	Southern Europe	5.1	0.00%	0.976
Congo	650.0	0.04%	1.047	Bahamas	57.5	0.00%	1.000	Sudan	6728.0	0.37%	0.974
Peru	9884.9	0.55%	1.047	Bhutan	13.3	0.00%	1.000	Saint Vincent	18.0	0.00%	0.974
Benin	48.0	0.00%	1.044	Central African R.	95.0	0.01%	1.000	Guyana	2762.3	0.15%	0.972
Rwanda	115.0	0.01%	1.043	Chad	390.0	0.02%	1.000	Southern Africa	21800.0	1.21%	0.969
Réunion	1888.2	0.11%	1.043	Djibouti	0.1	0.00%	1.000	South Africa	16800.0	0.94%	0.961
French Guiana	4.0	0.00%	1.038	Dominica	4.8	0.00%	1.000	Malaysia	800.0	0.04%	0.958
Madagascar	3000.0	0.17%	1.036	French Polynesia	3.0	0.00%	1.000	Costa Rica	3418.2	0.19%	0.956
DR Congo	1950.0	0.11%	1.036	Ghana	145.0	0.01%	1.000	Bangladesh	4671.4	0.26%	0.949
Somalia	230.0	0.01%	1.036	Grenada	7.2	0.00%	1.000	Melanesia	2086.0	0.12%	0.926
Guinea-Bissau	6.3	0.00%	1.035	Guinea	283.0	0.02%	1.000	Niger	176.7	0.01%	0.926
World	1794359.2	100.00%	1.027	Liberia	265.0	0.01%	1.000	Barbados	258.8	0.01%	0.925
Eastern Africa	34166.5	1.90%	1.024	Malawi	2500.0	0.14%	1.000	Belize	844.0	0.05%	0.916
Sierra Leone	77.0	0.00%	1.024	Portugal	5.1	0.00%	1.000	Fiji	1751.0	0.10%	0.914
Caribbean	24267.0	1.35%	1.024	Samoa	0.0	0.00%	1.000	Oceania	27270.9	1.52%	0.913
Ethiopia	2400.0	0.13%	1.022	Suriname	120.0	0.01%	1.000	Australia	25181.8	1.40%	0.912
Gabon	240.0	0.01%	1.022	Swaziland	5000.0	0.28%	1.000	AUS + NZ	25181.8	1.40%	0.912
Uruguay	314.0	0.02%	1.017	Wallis and Futuna	0.0	0.00%	1.000	Jamaica	1334.6	0.07%	0.907
Iran	5685.1	0.32%	1.017	Polynesia	3.1	0.00%	1.000	Morocco	632.3	0.04%	0.907
Philippines	34000.0	1.89%	1.015	Mauritius	4230.2	0.24%	1.000	Japan	1000.0	0.06%	0.904
Central America	98699.7	5.50%	1.015	Western Africa	5806.0	0.32%	0.998	Northern Africa	16397.5	0.91%	0.896
Tanzania	2500.0	0.14%	1.013	Ecuador	8131.8	0.45%	0.993	Colombia	22727.8	1.27%	0.877

Source: Data processed by author, Faostat, 2013

Table 2: World production of sugar cane, 2011.

Production		Import		Export		Consumption		Stock	
1,000 metric tons									
World	172310	World	48538	World	55144	World	163614	World	163614
Share in world									
Asia - Oceania	38.4%	Asia - Oceania	36.5%	World	48.245%	Asia - Oceania	42.2%	Asia - Oceania	52.1%
South America	26.3%	Middle East	19.9%	South America	45.336%	India	15.3%	India	17.3%
Brazil	21.8%	Africa	16.7%	Brazil	26.427%	South America	12.1%	China	12.6%
India	14.9%	North America	8.9%	Asia - Oceania	13.601%	Western Europe	11.4%	Western Europe	11.9%
Western Europe	9.7%	Western Europe	8.7%	Thailand	6.186%	EU-27	11.0%	EU-27	11.4%
EU-27	9.5%	EU-27	7.9%	Africa	5.622%	North America	10.1%	North America	8.7%
China	8.5%	Indonesia	6.6%	Australia	5.279%	China	9.4%	Thailand	7.9%
North America	8.2%	United States	6.1%	Central America	5.246%	Middle East	8.1%	Africa	6.9%
Thailand	5.8%	Eastern Europe	4.4%	India	3.990%	Africa	8.0%	South America	6.9%
Eastern Europe	5.1%	China	4.1%	Middle East	3.817%	Brazil	7.2%	Middle East	6.6%
Africa	4.9%	South America	3.9%	Guatemala	3.128%	United States	6.9%	United States	5.2%
United States	4.6%	Japan	3.2%	North America	3.085%	Eastern Europe	6.4%	Eastern Europe	4.3%
Mexico	3.5%	Canada	2.6%	Western Europe	2.811%	Russia	5.8%	Pakistan	3.4%
Middle East	3.2%	Egypt	2.4%	EU-27	2.720%	Indonesia	3.4%	Mexico	2.8%
Central America	2.8%	Russia	2.4%	Mexico	2.488%	Mexico	3.1%	Ukraine	1.8%
Russia	2.8%	India	1.9%	Eastern Europe	2.234%	Pakistan	2.9%	Central America	1.7%
Pakistan	2.7%	Caribbean	1.0%	Caribbean	1.949%	Egypt	2.7%	Japan	1.4%
Australia	2.5%	Colombia	1.0%	Colombia	1.587%	Thailand	1.8%	Indonesia	1.4%
Guatemala	2.0%	Mexico	0.7%	Cuba	1.269%	Turkey	1.6%	Brazil	1.3%
Philippines	1.4%	Australia	0.4%	South Africa	0.907%	Central America	1.4%	Philippines	1.0%
Ukraine	1.4%	South Africa	0.3%	Egypt	0.725%	Japan	1.2%	South Africa	0.9%
Colombia	1.4%	Dominican Rep.	0.2%	Russia	0.544%	Ukraine	1.2%	Colombia	0.9%
Turkey	1.3%	Ukraine	0.1%	Pakistan	0.544%	Philippines	1.2%	Caribbean	0.9%
South Africa	1.3%	Turkey	0.03%	Philippines	0.544%	Argentina	1.2%	Argentina	0.8%
Caribbean	1.3%	Thailand	0.01%	United States	0.452%	Colombia	1.1%	Russia	0.8%
Argentina	1.2%	Argentina	0.01%	Argentina	0.399%	South Africa	1.1%	Canada	0.7%
Indonesia	1.2%	Cuba	0.0%	Dominican Rep.	0.390%	Caribbean	1.1%	Turkey	0.6%
Egypt	1.2%	Guatemala	0.0%	Canada	0.145%	Australia	0.9%	Egypt	0.6%
Cuba	1.1%	Central America	0.0%	Turkey	0.109%	Canada	0.8%	Cuba	0.4%
Japan	0.8%	Brazil	0.0%	China	0.080%	Guatemala	0.7%	Guatemala	0.4%
Dominican Rep.	0.4%	Pakistan	0.0%	Ukraine	0.063%	Cuba	0.5%	Australia	0.2%
Canada	0.3%	Philippines	0.0%	Japan	0.002%	Dominican Rep.	0.4%	Dominican Rep.	0.2%

Source: Data processed by author, USDA, Faostat, 2013

Table 3: The distribution of forces on the world sugar market in the period of 2012/2013 (in the raw sugar equivalent)  
- The volume of production, trade, consumption and stocks over the period of 2012/2013.

Table 3 can more than confirm the high degree of concentration of the world market in terms of distribution of the available capacity in production, stocks and realized export. It also shows that the process of concentration of the world market continues. The concentration in this respect concerns mainly areas associated with the shares held by individual players related to the world trade and then also in association to the ownership of the world's supply of sugar.

The focus on the analysis of the dynamics of the growth rate of world production, consumption

and trade, reveals that the world production during the recent years of 2008/2009 - 2012/2013 was growing at an average rate of 4.6% per year, the volume of trade was rising at 4.2% per year on average, the annual sugar consumption was increasing at about 1.5% , and the volume of world reserves grew by about 5.8% per year. There are significant differences between various regions of the world in terms of the growth dynamics of production, consumption and trade.

Production and trade are growing particularly in the Asia-Pacific region (6.3% and 8.6%

per annum respectively). In general, the high growth rate (above world average) is maintained in the production of the Middle East and Eastern Europe. High dynamics in the production growth is sustained particularly in Canada, India, Russia, Ukraine, Thailand, Pakistan and Egypt. In regard to export, the above-average growth rate of the realized volume is maintained especially by Indonesia, Turkey, India, Egypt, Pakistan, USA, Russia, Colombia, Thailand, Canada and the Philippines.

Sugar consumption has been growing very dynamically in recent years, especially in Thailand, Canada, Turkey, Dominican Republic, South

Africa, Colombia, Indonesia, Australia, USA, EU 27, Egypt and India. In regard to the regions, apart from the Asian-Pacific area, a high rate of consumption exists also in Africa, Central America and, in general, also in Western Europe. In recent years the stocks have been increasing especially in North and South Americas, the Caribbean, and Western European countries. The most important sources of accumulation of reserves include mainly China, USA, Cuba, Indonesia, Mexico, the European Union, Pakistan, Ukraine, the Dominican Republic and South Africa.

In addition to the growth in production and consumption of sugar, it is clear that sugar trade is

Country Mktg Year	Production	Country Mktg Year	Imports	Country Mktg Year	Exports	Country Mktg Year	Stocks
Canada	1.220	Cuba	N/A	Indonesia	N/A	Brazil	N/A
India	1.126	Guatemala	N/A	Turkey	1.861	Argentina	N/A
Russia	1.086	Central America	N/A	India	1.770	South Africa	1.855
Ukraine	1.084	Brazil	N/A	Egypt	1.414	Dominican Republic	1.503
Thailand	1.084	Thailand	N/A	Pakistan	1.414	Ukraine	1.323
Pakistan	1.074	Pakistan	N/A	United States	1.193	South America	1.298
Eastern Europe	1.073	Philippines	N/A	Russia	1.107	Pakistan	1.242
Asia - Oceania	1.063	Dominican Republic	1.414	Colombia	1.106	EU-27	1.183
Egypt	1.057	Colombia	1.244	Middle East	1.101	Western Europe	1.159
Middle East	1.054	China	1.167	Thailand	1.091	Mexico	1.142
World	1.046	Mexico	1.070	Asia - Oceania	1.086	Indonesia	1.127
Brazil	1.042	EU-27	1.049	Canada	1.084	North America	1.106
United States	1.040	Canada	1.046	Philippines	1.075	Cuba	1.099
EU-27	1.040	Western Europe	1.045	World	1.042	United States	1.096
Western Europe	1.039	South America	1.043	Brazil	1.038	Caribbean	1.072
North America	1.039	Asia - Oceania	1.043	Eastern Europe	1.037	China	1.064
Philippines	1.034	Africa	1.041	South America	1.034	World	1.058
Mexico	1.034	World	1.026	EU-27	1.030	Canada	1.051
South America	1.033	North America	1.024	Western Europe	1.030	Philippines	1.047
Central America	1.027	Middle East	1.020	Central America	1.028	Thailand	1.046
Turkey	1.023	United States	1.013	North America	1.022	Asia - Oceania	1.039
China	1.023	Caribbean	1.003	Guatemala	1.011	Eastern Europe	1.036
Dominican Republic	1.021	Turkey	1.000	Japan	1.000	India	1.030
Cuba	1.015	Japan	0.994	Mexico	0.999	Africa	1.029
Caribbean	1.011	Egypt	0.955	Dominican Republic	0.998	Japan	0.996
Guatemala	1.010	South Africa	0.938	Cuba	0.991	Middle East	0.984
Africa	1.010	Eastern Europe	0.889	Ukraine	0.986	Central America	0.897
Colombia	1.004	Russia	0.804	Caribbean	0.984	Russia	0.885
Indonesia	0.998	India	0.779	Africa	0.973	Turkey	0.833
South Africa	0.990	Ukraine	0.662	Australia	0.969	Egypt	0.694
Australia	0.972	Argentina	0.556	China	0.875	Guatemala	0.631
Argentina	0.964	Australia	0.416	South Africa	0.806	Australia	0.600
Japan	0.955	Indonesia	0.099	Argentina	0.784	Colombia	-0.053

Source: Data processed by author, USDA, Faostat, 2013

Table 4: Basic development trends in the areas of production, trade, consumption and stockpiles of sugar in the years of 2008/2009 – 2012/2013 (average annual growth rate).



also growing very dynamically. Many countries are not able to meet the growth in the domestic demand through increasing their own production volumes and some countries are unable to compete in price with cheaper sugar from the areas which are more production-equipped. The growing consumption of sugar is the engine that drives the expansion of imports of sugar in certain regions of the world. Imports are rising very significantly especially in Western Europe and in some Latin American countries, as well as in the Asia-Pacific region, Africa and North America. The main importers of sugar include China, Mexico, Colombia, Dominican Republic, EU and Canada.

Regarding the development of the global sugar reserves - despite the currently declining stock levels, the long-term growth rate of sugar stored

in individual countries and regions is increasing. During the observed period alone, the growth rate of stock volumes amounted to nearly 6% per year and in a number of countries (Brazil, Argentina, South Africa, Dominican Republic, Ukraine, Pakistan, Mexico, Indonesia, Cuba, USA and China) and regions (South America, EU and Western Europe, North America and the Caribbean) this rate was even higher.

From the above data it is unambiguously clear that the world market or the production and trade are completely controlled by a limited number of entities/subjects. The predominance of these entities is also further confirmed by the following analysis of the distribution of comparative advantages. The results of the analysis show that in an inter-regional comparison the comparative advantages

Country	LFI	Country	LFI	Country	LFI	Country	LFI
Panama	40.47	Rep. of Moldova	4.39	Saudi Arabia	-0.77	Tunisia	-7.01
Costa Rica	34.67	Portugal	4.34	Netherlands	-1.01	Kazakhstan	-7.88
Paraguay	33.4	Peru	4.21	Yemen	-1.12	Russian	-8.5
Philippines	30.45	Uganda	4.14	Tanzania	-1.34	Oman	-8.55
Serbia	24.67	Germany	3.83	Malta	-1.37	Finland	-8.63
France	22.95	Singapore	3.78	Albania	-1.38	Hong Kong	-9.53
Barbados	22.66	Belarus	3.42	Bolivia	-1.49	Ireland	-10.4
Mexico	19.45	Mauritius	3.07	Cyprus	-1.57	Chile	-10.9
Nicaragua	18.72	Niger	2.18	Kyrgyzstan	-1.64	Namibia	-11.22
Dominican Rep.	18.23	Luxembourg	2.05	Colombia	-1.69	Ecuador	-11.94
South Africa	16.45	Guyana	2.02	Senegal	-1.76	Switzerland	-12.57
Croatia	14.68	Romania	1.58	United Kingdom	-1.93	Hungary	-12.68
Cambodia	13.76	Madagascar	1.5	Ghana	-2.17	New Zealand	-13.22
El Salvador	12.91	Montenegro	1.42	Bahrain	-2.28	Egypt	-13.48
Austria	10.44	Bosnia Herzegovina	1.32	Nepal	-2.37	Bulgaria	-13.62
Zimbabwe	10.14	Brazil	1.02	Norway	-2.44	Co'te d'Ivoire	-14.39
Czech Rep.	10.08	Armenia	1.01	Belgium	-2.63	Indonesia	-15.19
Denmark	10.01	Algeria	0.85	Argentina	-2.95	EU-27	-17.19
Guatemala	9.41	Saint Kitts and Nevis	0.81	Lithuania	-2.97	Macedonia	-17.63
Zambia	9.21	Turkey	0.74	Latvia	-2.97	Lebanon	-19.46
Australia	8.3	St. Vincent, Grenad.	0.67	Estonia	-3.05	USA	-20.66
Viet Nam	7.77	New Caledonia	0.2	Iceland	-3.22	Israel	-20.67
Sweden	7.7	Suriname	0.01	Greece	-3.46	Italy	-21.43
Azerbaijan	7.45	Bahamas	0	Slovakia	-3.93	Botswana	-23.03
Mozambique	7.01	Burkina Faso	0	Rep. of Korea	-5.46	Iran	-23.84
Poland	6.99	Venezuela	0	Slovenia	-5.54	Spain	-23.94
Malawi	6.21	Rwanda	-0.04	Jordan	-6.2	Canada	-24.96
Thailand	6.14	Aruba	-0.09	Malaysia	-6.29	Ukraine	-34.08
India	5.9	Sri Lanka	-0.55	Cameroon	-6.88	Pakistan	-35.45
Belize	5.55	Nigeria	-0.71	Japan	-6.94	China	-40.95

Source: Data processed by author, UN Comtrade, 2013

Table 5: Distribution of comparative advantages on the sugar market on bilateral basis (at the level of HS 1701 aggregation in relation to HS 17 aggregation) – LFI index, 2012.

are possessed only by Latin America and then also by the Southeast Asian countries. At the country level, comparative advantage is held by approximately 52 countries (see Table 5.). In this regard, it should be noted that not all countries have comparative advantages at the global market, but they achieve comparative advantages in relation to a particular region or only in relation to a particular group of countries. Comparative advantage is then usually not determined by the competitiveness of a given region in relation to the global market, but by a given region/country/group of countries applying some form of protectionist policies that enable an expansion of their products into the markets of other countries (as an example can be mentioned the European Union and its member countries, as well as the USA, CIS countries - especially Russia, and some Asian countries).

When we focus on the analysis of the overall comparative advantages achieved by individual countries or regions or groups of countries in relation to the development of the value and volume of the global sugar market, regardless of bilateral trade exchanges, then we can say that comparative advantages are possessed especially by Latin America, Africa and some Southeast Asian countries. In relation to the various countries of the world, it can be stated that exports, which involve more than one hundred and twenty countries of the world, are marked by comparative advantages for about 46 countries (see details in Table 6).

The analysis of the RCA index largely confirms the results associated with the analysis of the LFI index. In this regard, it can be seen that the countries which acquire comparative advantages

Country	RCA	Country	RCA	Country	RCA	Country	RCA
Bahamas	1.45	Panama	1.28	Poland	0.78	Hong Kong	0.23
Burkina Faso	1.45	Romania	1.27	Lithuania	0.76	Israel	0.23
Malawi	1.45	Bosnia Herzegovina	1.24	Denmark	0.72	Cyprus	0.21
Cambodia	1.45	Guatemala	1.24	Australia	0.7	Italy	0.19
Saint Kitts and Nevis	1.44	Dominican Rep.	1.24	Cameroon	0.68	Turkey	0.18
Madagascar	1.44	Saudi Arabia	1.24	Czech Rep.	0.67	Namibia	0.15
Azerbaijan	1.44	Costa Rica	1.23	Hungary	0.67	Lebanon	0.15
Algeria	1.43	France	1.21	Oman	0.66	USA	0.14
Brazil	1.43	Suriname	1.19	Tunisia	0.65	Sri Lanka	0.13
Barbados	1.43	South Africa	1.19	United Kingdom	0.65	Ireland	0.12
Paraguay	1.42	Peru	1.17	Estonia	0.63	Nigeria	0.11
Uganda	1.42	Philippines	1.16	EU-27	0.59	Canada	0.11
Saint Vincent	1.41	Tanzania	1.11	El Salvador	0.56	Bahrain	0.09
Niger	1.41	Yemen	1.1	Belgium	0.54	Switzerland	0.09
Mauritius	1.41	Singapore	1.07	Bolivia	0.53	Macedonia	0.09
Belize	1.39	Malaysia	1.01	Sweden	0.53	Venezuela	0.08
Belarus	1.38	Greece	0.99	Argentina	0.52	China	0.06
Mozambique	1.37	Colombia	0.98	Germany	0.52	Pakistan	0.06
Montenegro	1.37	Senegal	0.97	Luxembourg	0.5	Aruba	0.05
Armenia	1.36	Mexico	0.95	Finland	0.48	Japan	0.05
Zimbabwe	1.36	Rwanda	0.94	Russia	0.44	Norway	0.04
Thailand	1.36	Rep. of Moldova	0.93	Spain	0.35	Malta	0.03
Croatia	1.35	Egypt	0.92	Ecuador	0.34	Ukraine	0.03
India	1.34	Bulgaria	0.89	Jordan	0.32	Nepal	0.02
Nicaragua	1.31	Austria	0.89	Iran	0.32	Kyrgyzstan	0.01
Zambia	1.31	Rep. of Korea	0.89	Kazakhstan	0.29	Botswana	0.01
Portugal	1.3	Slovakia	0.88	Co'te d'Ivoire	0.28	Indonesia	0.01
Guyana	1.28	Slovenia	0.87	Togo	0.27	Ghana	0.01
Serbia	1.28	Latvia	0.87	Netherlands	0.27	Chile	0
New Caledonia	1.28	Viet Nam	0.85	New Zealand	0.24	Albania	0

Source: Data processed by author, USDA, 2013

Table 6: Distribution of comparative advantages on the sugar market in relation to the global market – RCA Index, 2012.

in relation to the world market and, at the same time, also in relation to bilateral trade exchanges, are more or less the same ones. An exception in this respect is made only by Malaysia, Saudi Arabia, Yemen and Tanzania, which, although they do not have bilateral comparative advantages, possess comparative advantages in relation to the world market - this points to a disproportionate share of sugar in trade with the HS17 aggregation.

Additionally, there is a specific position held by countries such as Australia, Czech Republic, Denmark, El Salvador, Luxembourg, Mexico, Germany, Moldova, Poland, Sweden, Turkey and Vietnam, which, although not having comparative advantages on the world market, they have comparative advantages in terms of bilateral trade exchanges in relation to selected countries. This refers to their ability to find partners

within the framework of the global market over which these countries have the upper hand, or carry out trade within a specific environment that is different from the global market - this applies particularly member countries of the EU. In relation to the development in the world sugar market it should be pointed out that although sugar is a perfectly homogeneous product - its price across the world is not uniform. There are very significant price differences between individual regions, which are determined by different policies of the involved countries towards sugar industry.

Another factor affecting the price of sugar and its variations at the international and inter-regional levels is the fact that different countries are able to produce sugar with different costs. There is a significant difference between the efficiency and profitability of sugar production in the countries

Country	Export USD/kg	Country	Export USD/kg	Country	Export USD/kg	Country	Export USD/kg
Malta	4.39	Bolivia	0.99	Hong Kong	0.83	India	0.7
Bahamas	3.98	New Zealand	0.99	Germany	0.82	Ukraine	0.7
Ghana	3.61	Chile	0.99	Czech Rep.	0.82	EU-27	0.7
Nigeria	3.34	Greece	0.99	Suriname	0.82	Bahrain	0.69
Sri Lanka	3.29	Jordan	0.99	Belgium	0.82	Cambodia	0.68
Aruba	3.26	Co'te d'Ivoire	0.98	Italy	0.82	Iran	0.67
Norway	2.66	Kazakhstan	0.97	New Caledonia	0.82	Australia	0.67
Palestine	2.25	Romania	0.96	Israel	0.81	Yemen	0.65
Luxembourg	2.18	Poland	0.95	Rep. of Korea	0.81	Iceland	0.65
Albania	1.77	Tunisia	0.95	Saint Kitts,Nevis	0.81	Dominican Rep.	0.64
Gambia	1.68	Netherlands	0.95	Belarus	0.8	Viet Nam	0.63
Slovakia	1.68	Canada	0.95	Denmark	0.8	Costa Rica	0.63
Switzerland	1.61	Croatia	0.95	Armenia	0.8	Guyana	0.62
Cyprus	1.49	Spain	0.93	Algeria	0.8	Philippines	0.61
Japan	1.34	Egypt	0.93	Oman	0.79	USA	0.6
Indonesia	1.32	Lebanon	0.92	Turkey	0.78	Brazil	0.59
Singapore	1.29	Senegal	0.91	Saudi Arabia	0.78	Pakistan	0.59
Ireland	1.27	Rep. of Moldova	0.91	Malawi	0.78	Tanzania	0.58
Latvia	1.21	Azerbaijan	0.9	Ecuador	0.78	Nicaragua	0.57
Namibia	1.2	Panama	0.87	Peru	0.77	Zambia	0.57
Kyrgyzstan	1.19	China	0.86	Russian	0.76	El Salvador	0.56
Estonia	1.18	Mexico	0.86	France	0.76	Thailand	0.56
Slovenia	1.15	Bosnia Herzeg.	0.85	South Africa	0.75	Guatemala	0.5
Bulgaria	1.14	Austria	0.85	Malaysia	0.74	Zimbabwe	0.49
Paraguay	1.13	United Kingdom	0.84	Uganda	0.74	Barbados	0.46
Rwanda	1.12	Sweden	0.84	Madagascar	0.74	Niger	0.46
Hungary	1.09	Lithuania	0.84	Mauritius	0.73	Mozambique	0.44
Macedonia	1.05	Finland	0.84	Argentina	0.72	Venezuela	0.2
Portugal	1.02	Serbia	0.84	Montenegro	0.72	Nepal	0.28
Cameroon	1	Qatar	0.83	Colombia	0.7	Belize	0.23

Source: Data processed by author, UN Comtrade, 2013

Table 7: Worldwide sugar prices – declared export prices (at the level of HS 1701), 2012.

that produce this commodity from the processing of sugar beet and in those which process sugar cane.

Sugar cane provides higher yields of sugar per hectare of cultivated land, allows more efficient use of sugar mills, the sugar campaign duration can be several times longer than that of the beet campaign, and so on. Overall, the cane sugar is much more competitive on the world market than the beet sugar. In this respect, it is necessary to point out one more - a very significant comparative advantage that cane sugar has compared with beet sugar.

Sugarcane is produced in regions where the cost of the production factors (labour, land, capital) are significantly lower than in the countries dominated by sugar beet. Another fact which is

disadvantageous for sugar beet compared with sugar cane is that the environmental, social, labour, technical and other standards in many countries (especially the developed ones) make the economics of beet sugar production very much more expensive.

Regarding the prices of sugar, Table 7 demonstrates that the differences existing between countries and regions are really very great. For example, while Malta exports one kilogram of sugar for more than 4 USD, Botswana does the same for less than 10 cents. In respect to individual regions, it can be observed that the highest sugar prices are generally those in the OECD countries, especially in European countries, and there are also high prices in the countries of the CIS and Africa.

Country	Import USD/kg	Country	Import USD/kg	Country	Import USD/kg	Country	Import USD/kg	Country	Import USD/kg
Costa Rica	x	Philippines	0.91	Ecuador	0.84	Russian Federation	0.74	Belize	0.6
Brazil	x	Saint Vincent	0.91	Ireland	0.83	Belarus	0.74	Ukraine	0.6
Panama	x	Germany	0.91	Romania	0.83	Bosnia Herzeg.	0.74	Armenia	0.59
Bahamas	4.25	Czech Rep.	0.91	Cameroon	0.83	Guyana	0.73	Co'te d'Ivoire	0.58
Guatemala	2.87	Kyrgyzstan	0.9	Senegal	0.81	Colombia	0.73	Iran	0.57
Zambia	2.59	Vanuatu	0.9	Italy	0.81	Mauritius	0.73	Bhutan	0.54
Malawi	2.56	S Palestine	0.9	Rep. of Moldova	0.81	Algeria	0.72	Malaysia	0.54
El Salvador	1.79	Serbia	0.89	Bahrain	0.81	Samoa	0.72	Azerbaijan	0.53
Nicaragua	1.76	Cape Verde	0.89	Greece	0.8	United Kingdom	0.72	Burkina Faso	0.53
Luxembourg	1.58	Estonia	0.88	Poland	0.8	Ethiopia	0.72	Namibia	0.5
Montserrat	1.48	Malta	0.87	Georgia	0.8	Bermuda	0.71	Afghanistan	0.4
Slovakia	1.43	Switzerland	0.87	Montenegro	0.79	New Zealand	0.71	Chile	0.4
Aruba	1.41	France	0.87	Croatia	0.79	Dominican Rep.	0.71	Niger	0.38
Greenland	1.36	Paraguay	0.87	Saint Kitts Nevis	0.79	Portugal	0.71	Nepal	0.38
Turkey	1.18	Barbados	0.86	Madagascar	0.79	Egypt	0.7	Cambodia	0.37
Oman	1.07	Bolivia	0.86	Rwanda	0.79	Viet Nam	0.7	Venezuela	0.34
New Caledonia	1.06	Uganda	0.86	Suriname	0.78	Saudi Arabia	0.7	Mozambique	0.32
Tonga	1.03	Jordan	0.86	Tunisia	0.78	Lithuania	0.7	Gambia	0.2
Slovenia	1.01	Denmark	0.85	Yemen	0.77	South Africa	0.7	Togo	0.17
Nigeria	1	Spain	0.85	Botswana	0.77	Indonesia	0.7	Mauritania	0.12
Norway	0.97	Lebanon	0.85	Finland	0.77	Israel	0.69		
Maldives	0.97	Albania	0.85	Austria	0.76	Canada	0.69		
Latvia	0.96	Zimbabwe	0.85	Japan	0.76	Thailand	0.69		
Iceland	0.96	Hungary	0.84	Hong Kong	0.76	Rep. of Korea	0.68		
Cyprus	0.95	Cent. Afric. Rep.	0.84	Peru	0.76	Tanzania	0.67		
Kiribati	0.94	Kazakhstan	0.84	Australia	0.75	Ghana	0.67		
Polynesia	0.94	Mexico	0.84	EU-27	0.75	China	0.67		
Bulgaria	0.94	Argentina	0.84	Singapore	0.74	Belgium	0.66		
Sweden	0.93	USA	0.84	Pakistan	0.74	Turks, Caicos	0.64		
Netherlands	0.92	Macedonia	0.84	Sri Lanka	0.74	India	0.61		

Source: Data processed by author, USDA, 2013

Table 8: Worldwide prices of sugar – declared import prices, 2012.

By contrast, relatively lower export prices can be found in the countries of Southeast Asia and Latin America.

When we speak about the price variations in the global trade = there are very significant differences even in terms of the declared import prices of sugar. Table 8 demonstrates the fact that the world prices of imported sugar (the average prices of raw and refined sugar) differ considerably between countries and regions and range from 0.12 cents per kilogram up to about 4 USD per kilogram.

In respect to regions, on average the highest import prices are implemented in the EU member states and North America. High prices are generally shown by the OECD member countries. By contrast, the lowest declared minimum import prices can be found in the countries of Asia and especially in the countries of Latin America.

## **Conclusions**

The worldwide production of sugar crops, or the entire market with sugar crops products – particularly sugar and biofuels – is growing at a very rapid dynamic pace over time. It should be noted that both the volume and value of the production and trade have risen unusually quickly in recent years. The volume of the sugar crops - mainly sugar cane, but also sugar beet - have increased considerably. Over the past five years alone the volume of sugar beet and sugar cane has grown on average by 2.5% and 2.7% per annum respectively.

In respect of the current increase in the global production and consumption of sugar crops, it should be noted that mainly due to intensive promotion of the biofuel production in recent times, most of the growth in the volume of the sugar crops production - especially sugar beet – is transformed into biofuels - whose volume and consumption is rising sharply worldwide. Only about one-third of the increase in the sugar crops production is utilized for the manufacture of sugar as such.

When analyzing the global production of sugar crops, it quickly becomes obvious that its production is very strongly concentrated. In the case of sugar beet Russia, EU, Turkey and the USA represent about three quarters of its world production. Likewise, in the case of sugar cane Brazil, Thailand, China, India and Pakistan account for almost three quarters of its world production volume.

The above comments and results relating to the aims of this article clearly indicate that the global cultivation of sugar cane and sugar beet is concentrated within a limited segment of countries. The results of the processed analysis also demonstrate that the actual worldwide sugar market is also highly concentrated and the concentration process is constantly continuing. The world sugar production and trade are dominated by a limited number of entities that maintain their control over the volume of production and trade.

From the point of view of production and trade the most dominant regions currently include mainly Southeast Asia and Latin America. The key sugar producers in the world are Brazil, India, China and Thailand (their cumulative share of the world production exceeds 50%). An important role is also played by Europe and North America, which contribute about 20% of the global production.

In relation to the global trade, it is necessary to highlight the extreme predominance of Brazil, Thailand, Australia and India. These export-oriented countries participate in the global sugar exports by nearly 75%. From this it is clear that a mere four countries control more than ¾ of the worldwide sugar trade. And just like the sugar production and trade are concentrated so are the world sugar stockpiles of which almost 60% are controlled by China, India, the European Union, Thailand, USA, Pakistan and Mexico

It is appropriate to point out the fact that the worldwide sugar consumption is also concentrating. Currently, most of the sugar used in the world is consumed in India, EU, China, Brazil, USA, Russia, Indonesia, Mexico and Pakistan (in total this amounts to more than 60% of the world sugar consumption). It is important to note that as the market is concentrating so are also the comparative advantages in relation to the sugar trade. At present the comparative advantages in relation to the global market are possessed especially by the Latin American region and Southeast Asia.

To a limited extent, the comparative advantages in relation to the sugar trade are possessed by approximately forty to fifty countries around the world. However, most of these countries do not have a comparative advantage in relation to the global market as a whole, but they possess comparative advantages on a regional basis - i.e. a comparative advantage is determined

by a specific situation that prevails on the market within the framework of a given region, for instance, the existence of bilateral or multilateral trade agreements, the existence of a free trade zone, customs union, the single market, etc.

The countries that have comparative advantages on a regional rather than global basis, include CIS countries, the member countries of EU and, for example, some member countries of NAFTA, as well as some African and Asian countries. The obvious comparative advantages in relation to the global market are possessed particularly by countries producing sugar from sugar cane, especially those located mainly in South Asia, in Central and South America and then also some African countries.

It is important to mention the fact that because the world sugar market is still not fully liberalized, there are significant barriers that prevent the development of global trade in sugar. A wide range of markets is insulated against the influence of the worldwide market by the protectionist policies of a number of countries, and it is also clear that there are considerable price differences in buying and selling sugar. In relation to the prices of exports implemented between individual countries around the world there are very significant differences.

The differences in this respect exist not only at the regional levels, but also between developed and developing countries. It should also be noted that at the regional level the export price of sugar fluctuates between USD 0.58 to 1.10 per kg. By contrast, in the various countries being analyzed, the prices of exports round the world oscillate in the range of USD 0.10 - 4.39 per kg. Thus, if we consider the world sugar market from a global perspective, one has to state that we are looking at a quantity which is evolving very dynamically.

*Corresponding author:*

*Prof. Ing. Svatoš Miroslav, CSc.*

*Department of Economics, Faculty of Economics and Management,*

*Czech University of Life Sciences in Prague, Kamýcká 129, 165 21 Prague 6, Czech Republic*

*Phone: +420 224 38 2288, E-mail: svatos@pef.czu.cz*

## **References**

- [1] Balassa, B. Trade liberalization and 'revealed' comparative advantages, *The Manchester School of Economic and Social Studies*, 32, 2, 1965: 99-123. ISSN: 10490078.

In relation to its future development, it can be expected that there will be further growth in the dynamics of the volume of both the production and consumption and, last but not least, in trade. In particular, the process of liberalization of world trade, which will lead to the removal of trade barriers across all regions, will also lead to a realignment of production capacity across the regions.

The growing demand for sugar and also for sugar crops will lead to further growth in sugar prices on the world market and for this reason it is rather difficult to predict the future shape of the sugar market. The rising sugar prices will be reflected in the profitability of the sector and thus a situation could arise in which the regions that today seem unpromising in terms of production and export may gradually become promising.

However, in this respect it has to be emphasized that the formation of the market is not only a question of economics, but also a question of strategic-political dimension. It is, therefore, very difficult to state what the further development of the global market will be like. In general, it is only possible to make an educated guess that the supply and demand for sugar will continue to rise. It is also possible to expect growth in prices, and that the market or its territorial structure will become even more concentrated.

However, in this regard it should be noted that in the coming years the actual nature of the sugar market will be very significantly affected by individual countries' policies towards the agrarian market and towards sugar as such. An important role will also be played by the current hotly debated issue of biofuels or, more precisely, a decision to increase or decrease their production and the degree of support for their production by public sources.

- [2] Burianová, J., Belová, A. The Competitiveness of Agricultural Foreign Trade Commodities of the CR Assessed by Way of the Lafay Index. *Agris on-line Paper in Economics and Informatics*, 4, 4, 2012. ISSN: 1804-1930.
- [3] Devadoss, S., Kropf, J. Impacts of trade liberalizations under the Uruguay Round on the world sugar market. *Agricultural Economics*, 15, 2, 1996, p. 83-96. ISSN: 1574-0862.
- [4] Dillen, K., Demont, M., Tollens, E. European Sugar Policy Reform and Agricultural Innovation. *Canadian Journal Of Agricultural Economics-Revue Canadienne D Agroeconomie*, 56, 4, 2008, p. 533-553. ISSN: 1744-7976.
- [5] FAO. FAOstat database. [on-line] <http://faostat.fao.org/DesktopModules/Admin/Logon.aspx?tabID=0>, cit. 15. 04. 2013.
- [6] Fidrmuc, J., Grozea-Helmenstein, D., Wörgötter, A. East-West Intra Industry Trade Dynamics. *Weltwirtschaftliches Archive / Review of World Economics*, 135, 2, 1999, p. 332-346. ISSN: 1610-2886.
- [7] Janda, K., Kristoufek, L., Zilberman, D. Biofuels. Policies and Impacts. *Agric. Econ. – Czech*, 58, 2012, p. 372-386. ISSN: 0139-570X.
- [8] Jeníček, V. Globalisation – challenges, rewards, question. *Agric. Econ. – Czech*, 58, 2012, p. 275-284. ISSN: 0139-570X.
- [9] Lafay, G. The Measurement of Revealed Comparative Advantages. In Dagenais, M. G.; Muet P. A.: *International Trade Modelling*. London: Chapman & Hall, 1994. ISBN: 0412450003.
- [10] Neundoerfer, M. European sugar policy. *Unde venit - Quo vadit. ZUCKERINDUSTRIE*, 136, 5, 2011, p. 317-324. ISSN: 0344-8657.
- [11] Pokorná, I., Smutka, L., Pulkrábek, J. Světová produkce cukru. *Listy Cukrovarnicke a Reparske*, 127, 4, 2011, p. 118-120. ISSN: 1210-3306.
- [12] Poonyth, D., Westhoffb, P., Womack, A. et al.: Impacts of WTO restrictions on subsidized EU sugar exports. *Agricultural Economics*, 22, 3, 2000, p. 233-245. ISSN: 1574-0862.
- [13] Rumánková, L., Smutka, L., Pulkrábek, J., Benešová, I. Tvorba ceny cukru na světovém trhu - Přenos ceny surového a bílého cukru. *Cukrovarnicke a Reparske*, 128, 9-10, 2012a, p. 274-279. ISSN: 1210-3306.
- [14] Rumánková, L., Smutka, L., Pulkrábek, J., Benešová, I. Vliv zásob cukru na jeho nabídku na světovém trhu. *Listy Cukrovarnicke a Reparske.*, 128, 12, 2012b, p. 381–384. ISSN: 1210-3306.
- [15] Smutka, L., Pokorná, I., Pulkrábek, J. Analýza konkurenceschopnosti vzájemného obchodu se surovým a bílým cukrem mezi jednotlivými regiony světa . *Listy Cukrovarnicke a Reparske*, 128, 4, 2012a, p. 141-145. ISSN: 1210-3306.
- [16] Smutka, L., Pokorná, I., Pulkrábek, J. Světová produkce cukrodárných plodin. *Listy Cukrovarnicke a Reparske*, 127, 3, 2011a, p. 78-82. ISSN: 1210-3306.
- [17] Smutka, L., Pokorná, I., Pulkrábek, J. Světový obchod s bílým cukrem. *Listy Cukrovarnicke a Reparske*, 128, 3, 2012b, p. 86-89. ISSN: 1210-3306.
- [18] Smutka, L., Pokorná, I., Pulkrábek, J. Vývoj světového obchodu s cukrem z pohledu posledních čtyř dekád. *Listy Cukrovarnicke a Reparske*, 127, 9-10, 2011b, p. 281-285. ISSN: 1210-3306.
- [19] Smutka, L., Rumánková, L., Pulkrábek, J., Benešová, I. Hlavní determinanty nabídky a poptávky na světovém trhu s cukrem. *Listy cukrov. řepář.*, 129, 4, 2013: 142–145. ISSN: 1210-3306.
- [20] UN COMTRADE. Statiostical Databasis of World Trade. UN, 2013, Available at: <http://comtrade.un.org/db/> [cit. 18/04/2013]
- [21] USDA. New York Board of Trade. [on-line] <http://www.ers.usda.gov/Briefing/Sugar/Data.htm>, cit. 11. 04. 2013.

- [22] Zaghini, A. Evolution of trade patterns in the new EU member states. *Economics of Transition*, 13, 4, 2005, p. 629-658. ISSN: 1468-0351.
- [23] Zaghini, A.: Trade advantages and specialization dynamics in acceding countries. European Central Bank, 2003. ISSN 1561-0810.