

# The factors of competitiveness and the quantification of their impact on the export efficiency of grape and wine in the Slovak Republic

## *Faktory konkurencieschopnosti a kvantifikácia ich dopadu na exportnú efektívnosť hrozna a vína na Slovensku*

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**Abstract:** The paper devotes attention to evaluating the factors of competitiveness and the quantification of their impact on the export efficiency of grape and wine in the Slovak Republic. For the reason of bad conditions in grape production, Slovakia has not covered the domestic wine demand in years 1998–2003 and therefore wine was imported to Slovakia. Opposite to, some European wine-producing countries, Slovakia does not suffer from wine overproduction and Slovak vintners have not got problems with selling their production on foreign market. After the downfall of custom protection, an increase of import was expected, mostly of cheap table wines. The chance for Slovak producers is the production of high quality wines, which are getting a good combination of quality and price in comparison with foreign quality wines. It is important, that Slovak consumers should know and prefer quality wines and that the export of Slovak wines are oriented also on other markets not only on the market of the Czech Republic.

**Key words:** competitiveness, Grubel-Lloyd index, revealed comparative advantage, foreign trade

**Abstrakt:** Príspevok sa zaoberá hodnotením faktorov konkurencieschopnosti a kvantifikáciou ich vplyvu na exportnú efektívnosť hrozna a vína na Slovensku. Z dôvodu nepriaznivých podmienok v produkcii hrozna bolo potrebné importovať víno na Slovensko v období rokov 1998–2003. Oproti niektorým typicky vinárskym krajinám, Slovensko netrpí z nadprodukcie vína a slovenskí vinári nemali problémy s predajom produkcie na zahraničných trhoch. Po odstránení colných bariér sa zvýšil import najmä lacného vína na Slovensko. Príležitosťou pre slovenských producentov je produkcia vína vysokej kvality, ktoré v porovnaní so zahraničnou ponukou predstavujú lepší pomer ceny a kvality. Je dôležité, že export slovenského vína sa orientuje na rôzne trhy, nielen na trhy Českej republiky.

**Kľúčové slová:** konkurencieschopnosť, Grubel-Lloyd index, odkrytá komparatívna výhoda, zahraničný obchod

In the Slovak Republic, the viticulture is by the longtime tradition and the quality of the produced wine ranged as an important branches of agricultural production. In our area, wine was produced in the time before Christ by the Celts and after them by the Romans. Also in the time of the Great Moravian Empire, and after it, wine was used not only by the divine worship, but also as a beverage of feasts and celebrations. Wine was later sold in the so-called “small wine cellars”, or in the locals. After the Second World War, after the violent collectivization wine production moved into agricultural co-operatives.

At the beginning of 90-ties, Slovakia was superfluous in the wine production. The amount that was not consumed within the country routed mostly

to the Czech market. Today's production of wine is not sufficient for the domestic consumption and approximately the amount, that was formerly exported, is needed to import. There are more of the reasons of the wine production fall. Before all others, the production of wine grapes falls. The acreage of vineyards was decreasing for some years; some of the vineyards are not treated and renewed.

### MATERIAL AND METHODOLOGY

The paper devotes attention to the evaluation of the factors of competitiveness and the quantification of their impact on the export efficiency of grape and wine in the Slovak Republic. For the evaluation of

competitiveness of foreign trade, there were created many indicators on the basis of market or trade information. These indicators are often constructed for the separate commodities or the aggregations of commodities. Competitiveness is a relative rate and indicators with the base of absolute market share give only a little information about the competitive position of a product or sector in the economy (Balassa 1989; Vollharh 1991; Scott, Vollharh 1992; Foltyn 2001; Anderson 2001; Anderson et al. 2001). In the paper, there were used several indicators of competitiveness valuation, between them also some more complex indicators: *Relative Export Advantage Index (RXA)*, *Relative Import Penetration Index (RMP)* and *Relative Trade Advantage Index (RTA)*.

### Relative Export Advantage Index (RXA)

The *RXA* index is defined in the equation 1, where  $X$  means export. The indexes  $i$  and  $k$  mean the product category, and  $j, l$  represent countries. The index *RXA* is defined as a relation between the ratio of export of some product of the given country on the world market and the ratio of export of all others products of this country on the world market.

$$RXA_{ij} = (X_{ij} / \sum_{l, l \neq j} X_{il}) / (\sum_{k, k \neq i} X_{kj} / \sum_{k, k \neq i} \sum_{l, l \neq j} X_{kl}) \quad (1)$$

- If  $RXA_{ij} > 1$ , the country has a comparative advantage in the evaluated product category,
- If  $RXA_{ij} < 1$ , the country has a comparative disadvantage.

### Relative Import Penetration Index (RMP)

The Relative Import Penetration Index is very alike to the *RXA* index. The difference is that by the *RMP* index, the basis is on imports ( $M$ ) instead of exports in the *RXA* index. The interpretation of *RMP* is opposite from the *RXA*. The *RMP* index is defined in the equation 2.

$$RMP_{ij} = (M_{ij} / \sum_{l, l \neq j} M_{il}) / (\sum_{k, k \neq i} M_{kj} / \sum_{k, k \neq i} \sum_{l, l \neq j} M_{kl}) \quad (2)$$

- If  $RMP_{ij} > 1$ , the country has a comparative disadvantage in the product category,
- If  $RMP_{ij} < 1$ , the country has a comparative advantage.

### Relative Trade Advantage Index (RTA)

The *RTA* index is more complex than the *RXA* and *RMP* indexes and it is the difference between the *RXA* and *RMP*.

$$RTA_{ij} = RXA_{ij} - RMP_{ij} \quad (3)$$

The comparative advantage rated by this index is indirectly weighted by the importance of the relative export and import advantages.

- If  $RTA > 0$ , export has a higher comparative advantage than import,
- If  $RTA < 0$ , import has a higher comparative advantage than export.

While the *RXA* and *RMP* indexes use only export or import for calculation, *RTA* index considers both export and import. According to the increasing importance of the inner-branch trade, this aspect becomes very important.

### Revealed Comparative Advantage (RCA)

The *RCA* index is used for the evaluation of competitiveness of countries in foreign trade and it is a rate of the competitive advantage of particular commodity.

$$RCA = \ln [(X_i / M_i) : (X / M)] \quad (4)$$

where:

$X_i$  = value of export of the particular commodity out from the followed country

$M_i$  = value of import of the particular commodity to the followed country

$X$  = value of the total export of agro-food products from the followed country

$M$  = value of the total import of agro-food products into the followed country

- If  $RCA > 0$ , the commodity has a comparative advantage,
- If  $RCA < 0$ , the commodity has not the comparative advantage,
- If  $RCA = 0$ , the commodity does not have either comparative advantage or disadvantage.

The international exchange runs between the particular branches of production and also in the frame of the separate branches. On the international level, the bilateral trade exchange between two countries is from this point of view separated into the inter-industrial and intra-industrial.

Inter-industry trade is a trade with products of different production branches and intra-industry trade represents trade within one branch.

For calculation we use the following indicator:

### Grübel and Lloyd index:

$$GLi = 1 - \frac{|X_i - M_i|}{(X_i + M_i)} \quad (5)$$

where  $X_i$  and  $M_i$  represent export and import of the commodity of the chosen branch of the country  $i$  in one followed year. This indicator can reach value from 0 to 1.

## RESULTS AND DISCUSSION

According to the customs statistics in the years 1998–2003, the balance of foreign trade with must grapes was positive except the year 1998, when import was lightly over export. The must grapes are under the heading “Others” in the custom tariff. More than 90% of the imported must grapes in the followed time period came from Hungary and more than 90% of the exported must grapes routed to the Czech Republic.

In the followed time period 1998–2003, the price of the imported must grapes was lower than the average prices of grapes paid in our country to agricultural producers. Slovak producers could not compete with the price of the imported grapes and therefore the export of grapes abroad was preferable for them.

In foreign trade with wine, Slovakia has a negative balance in the years 1998–2003. A positive balance in the foreign trade with wine was reached only in the year 1998, when the amount of exported wine was slightly over the amount of wine imported. The highest negative balance of foreign trade was in year 2000, when the amount of the imported wine was over the import by 133 838 hectoliters. Custom tariff uses for the categories of wine the following names: sparkling wine, wine up to 2 liters, wine in general.

### Sparkling wine

According to the analysis of foreign trade with sparkling wine with the CR according to the  $RXA$

index, Slovakia reaches in the whole followed time period of the years 1997–2003 a high comparative advantage. In the year 2003, the value of export of sparkling wine into the CR was 312 times higher than the value of export of sparkling wine to other countries (CEFTA, EU).

The rate of the export of sparkling wine into the CR in the year 2003 and the export of sparkling wine to other countries (CEFTA, EU), similar to the rate of the agro-food production export into the CR and the agro-food production export to other countries (CEFTA, EU), showed in the years 1997–2003 a sharp increasing development (Table 1).

The  $RMP$  index reached in the years 1997–2003 values at about 1. On the basis of the more complex index  $RTA$ , it is possible to state, that the export of sparkling wine into CR was done with a higher comparative advantage than the import of this commodity during the whole followed time period of the years 1997–2003.

### Wine up to 2 liters

The indexes showing the share on the market with the wine to 2 liters (bottled wine) are presented in the Table 2. A high comparative advantage in the export of bottled wine into the CR is proved by the  $RXA$  index, which was during the followed time period of the years 1997–2003 several times higher than 1.

The highest number of the  $RXA$  index was reached in the year 1998, when the rate of the export of bottled wine to the CR compared to the export of this wine to other countries (CEFTA, EU) was 112 times higher than the rate of the agro-food products export to the CR compared to the export to other countries (CEFTA, EU). This values state that the big amount of the exported wine led directly to the CR. The value

Table 1.  $RXA$ ,  $RMP$  and  $RTA$  indexes for foreign trade of the SR with sparkling wine

Indexes	1997	1998	1999	2000	2001	2002	2003
$RXA$	8.49	8.05	7.12	21.06	23.42	268.27	362.54
$RMP$	0.57	1.38	3.04	1.22	0.66	0.93	1.59
$RTA$	<b>7.92</b>	<b>6.67</b>	<b>4.08</b>	<b>19.83</b>	<b>22.81</b>	<b>267.34</b>	<b>360.94</b>

Source: own calculation

Table 2.  $RXA$ ,  $RMP$  and  $RTA$  indexes for foreign trade with wine up to 2 liters

Indexes	1997	1998	1999	2000	2001	2002	2003
$RXA$	19.45	112.0	34.79	81.34	71.83	25.21	40.86
$RMP$	0	0	0	0.35	0	0	0
$RTA$	<b>19.44</b>	<b>112.0</b>	<b>34.79</b>	<b>80.99</b>	<b>71.83</b>	<b>25.20</b>	<b>40.86</b>

Source: own calculations

of the *RMP* is in the whole followed time period lower than 1, what signs that the share of the bottled wine import from the CR took a little part from the import of all wine to Slovakia. By the evaluation of the *RTA*, Slovakia had in the whole followed time period of years 1997–2003 a higher comparative advantage in export than in import of this commodity.

### Wine over 2 liters

Slovakia reached the comparative advantage in export of wine over 2 liters in the whole followed time period of the years 1997–2003 (Table 3). Values of the *RXA* index grew till the year 2002, when the *RXA* index reached the value 29.743. In the year 2003, the value fell to 16.504.

The *RMP* index shows a comparative advantage to the year 2001, when this index reached values less than 1. In the years 2002 and 2003, Slovakia reached a comparative disadvantage in the import of wine over 2 liters.

The *RTA* index reached in the whole followed time period of the years 1997–2003 values higher than 0 and the export of wine over 2 liters presented with a higher comparative advantage than import of this commodity.

### RCA index

Regarding the values of the *RCA* index (Table 4), Slovakia in followed time period of years 1996–2003 has not reached comparative advantage with countries EU-15 in foreign trade in any of wine category. The highest value of comparative disadvantage for wine was found in year 2002 ( $RCA = -2.949$ ).

In the foreign trade with bottled wine, the comparative disadvantage increased during the years 1996–2001, in the years 2002 and 2003 it was slowly falling.

More than 90% of wine export at all routed to the CR in the years 1996–2003, what reflected on high values of the *RCA* index (Table 5). In the year 2003, export of wine up to 2 liters created 40% of the whole export in the value of 127 524 thousand SKK.

More than 50% of total wine export was in the category of wine over 2 liters, in the value of 163 200 thousand SKK. In the followed time period till the year 2002, the export of wine over 2 liters to the CR was increasing, in the year 2003 it fell. The export of sparkling wine in the years 2002–2003 rose by 35% and fell about 12% regarding the wine up to 2 liters (bottled wine). In the year 1999 and 2003, there was only export to the CR in the category of wine over 2 liters, but no import.

Table 3. *RXA*, *RMP* and *RTA* indexes for foreign trade with wine over 2 liters

Indexes	1997	1998	1999	2000	2001	2002	2003
<i>RXA</i>	12.97	4.0	6.05	2.55	21.80	29.74	16.5
<i>RMP</i>	0.03	0.59	0.23	0.26	0.38	1.74	1.99
<b><i>RTA</i></b>	<b>12.93</b>	<b>3.41</b>	<b>5.81</b>	<b>2.29</b>	<b>21.42</b>	<b>28.0</b>	<b>14.5</b>

Source: owns calculations

Table 4. Foreign trade with wine with the EU-15 (*RCA*)

Commodity	1996	1997	1998	1999	2000	2001	2002	2003
Wine (together)	-1.981	-2.564	-0.823	-1.024	-1.79	-2.18	-2.949	-2.913
Sparkling wine	-2.025	-0.868	-0.145	-0.38	-0.828	-1.523	-1.818	-2.790
Wine up to 2 liters	-0.203	-1.079	-2.254	-2.226	-2.538	-3.101	-2.137	-1.415
Wine over 2 liters	-3.147	-5.809	-0.446	-0.812	-1.743	-2.017	-1.988	-1.961

Source: VUEPP, own counting

Table 5. Foreign trade with wine with the CR (*RCA*)

Commodity	1998	1999	2000	2001	2002	2003
Wine (together)	3.02	2.62	1.78	2.49	1.837	1.756
Sparkling wine	1.93	1.32	2.36	1.97	2.273	2.060
Wine up to 2 liters	2.97	2.78	1.94	1.94	1.138	0.905
Wine over 2 liters	7.10	–	1.10	9.41	6.548	–

Source: VUEPP, own counting

## Inter-industrial trade IIT

For getting a more complex information, there is analysed in the paper the inter-industrial trade with wine with countries of the EU and the CEFTA (years 1996–2001) and with the Czech Republic (years 1997–2003). The data got for years 1997–2003 show foreign trade with wine at all and from that separately foreign trade with the CR because of the fact, that to the CR was 90% of whole wine export directed. For the year 2004, there is analysed in the paper inter-industrial trade with the countries EU-25. A new category of following is the result of the oussion of 10 new countries to the EU in year 2004.

The index for evaluation of comparative advantages is the evaluation of IIT on the basis of Grübel-Lloyd index. The value of the GL index leading to 1 shows, that the amount of the exported and imported wine is equal and foreign trade is inter-industrial. The Grübel-Lloyd index has a high predicative ability in spite of the fact, that the disadvantage is that it analyzes the inter-industrial trade statically.

By the evaluation of foreign trade with wine with the countries of the EU in the years 1996–2004 according to the Grübel-Lloyd index, it is possible to state (Table 6), that the value of the index was lower in the category of wine over 2 liters. In the year 2001, foreign trade with wine over 2 liters showed a negative balance of 108 104 thousand SKK. The highest number of the Grübel-Lloyd index was reached by foreign trade with bottled wine in the year 2004 ( $GLi = 0.82$ ). In this year, foreign trade showed a negative balance in the value of 132 991 thousand SKK. In year 2004

counted Grübel-Lloyd index took into the account 25 countries of EU, what can reason the increase of indexes of each category.

In foreign trade with wine with the CEFTA countries, the value of the  $GLi$  reached a high number during the whole followed time period of the years 1996–2001. The biggest amount of wine was directed to the Czech Republic, concretely almost 100% during the followed time period.

The higher value of the  $GLi$  (Table 7) was reached in the category of wine over 2 liters (maximum in the year 1999). In this year, there was reached a positive balance of foreign trade with wine over 2 liters, concretely 78 484 thousand SKK.

## CONCLUSION

From the tendencies of the development of viticulture treating it issues, that viticulture does not belonged in the followed time period of the years 1996–2003 to stable parts of agricultural production. The variable development of grape production and per hectare yields in the years 1998–2003 was resulting the situation in Slovak viticulture. While the input prices increase since the year 1990 three to four times, the price of grapes was stable on the level of 10–12 SKK per kilogram. Vine-growers showed in average low per hectare yields, which were under the border of efficiency. The reason of this state is the fact, that in the transformation period, the viticulture and wine production was not solved completely. While viticulture stayed in the hands of agricultural co-operatives, wine producing

Table 6. Grübel-Lloyd index for foreign trade with wine with the EU

Commodity	1996	1997	1998	1999	2000	2001	2004*
Wine (together)	0.06	0.05	0.21	0.22	0.09	0.07	0.81
Sparkling wine	0.09	0.24	0.49	0.60	0.28	0.42	0.76
Wine up to 2 liters	0.33	0.19	0.06	0.07	0.05	0.03	0.82
Wine over 2 liters	0.02	0.00	0.30	0.26	0.10	0.09	0.81

\* In the year 2004, the  $GL$  index took into the account 25 countries of the EU

Source: own counting

Table 7. Grübel-Lloyd index for foreign trade with wine with the countries of the CEFTA

Commodity	1996	1997	1998	1999	2000	2001
Wine (together)	0.55	0.30	0.35	0.54	0.72	0.55
Sparkling wine	0.06	0.23	0.38	0.27	0.23	0.15
Wine up to 2 liters	0.31	0.15	0.23	0.32	0.55	0.63
Wine over 2 liters	0.30	0.75	0.52	0.95	0.75	0.45

Source: own counting

went its own way. Another reason was that vineyards have not got their owners and the relations were not clear, so it was risky to invest there. The conditions for viticulture begun to be better in the last years, when the vine-growers process their own grapes into wine and wine processing enterprises begun to buy vineyards. As a result, each producer knows which stuffs are used for his wine production. Also some purchase – supplier relations were dismantled.

Because of bad conditions in grape production, Slovakia has not covered domestic wine demand in the year 1998–2003 and therefore wine was imported to Slovakia. Opposite to some European wine-producing countries, Slovakia does not suffer from wine overproduction and Slovak vintners have not got the problems with selling their production on foreign market. After the downfall of custom protection, it the import increase was awaited, mostly of cheap table wines. The chance for Slovak producers is the production of high quality wines, which are in comparison with the foreign quality wines getting a good combination of quality and price. It is important, that Slovak consumer should know and prefer quality wines and that the export of Slovak wines is oriented also on other markets, not only on the market, of the Czech Republic.

Regarding the competitiveness increase of Slovak viticulture and wine production, according to the results from the paper, it is possible to make these conclusions:

- According to the differences of soil and climate conditions, the implementation of legislative measures, the shortness of financial sources and the increased world competition it is necessary to direct the production and export at high quality wines to 2 liters and sparkling wine,
- It is improstat apply for the subsidies for reconstruction and conversion of vineyards, which are dedicated for conversion to the types, which can produce higher crops in our geographical conditions. These the subsidies can be used also for relocation of vineyards – moving them to other place and for getting a better techniques of vineyards maintenance.
- There should increase the interest the state, vine-processors and wine producers for creation of

viticulture and wine production association with the aim to ensure the integrity of viticulture, wine production, development and research, market development, the control of grapes and wine export, trade and distribution of wine and to fulfill the requests and rules of the EU. In the association, there should take part the experts from the branch of viticulture, wine production and the Department of Agriculture. The association should be oriented on the support of wine export, guidance in the tourist trade, marketing and wine trade. The main finance source should be the deduction from each liter of wine produced in Slovakia from the domestic or imported stuff and from each hectare of vineyard.

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