The International Scientific Conference INPROFORUM 2017, *November 9, 2017, České Budějovice*, 114-119, ISBN 978-80-7394-667-8.

The Performance of Grape Wine Production and Trade in the Czech Republic

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Abstract: *Given that grape is an integral agrarian input for wine production in the Czech Republic, and wine is largely produced in the Moravia region and consumed across the country, this article attempts to assess the performance or trends of its production and trade in recent decades. The descriptive findings suggest that the grape area harvested, yields, prices, winemaking and consumption may have implications on production and trade in the Czech Republic. The statistical data also show that Czech wine export (of fresh grapes) has been highly volatile as it has concentrated in only two economies that shared border with the country. Similarly, the country has been a net importer of wine as consumption outweighs production, implying that there is room for more production and export. Export promotion should be encouraged and diversified beyond the EU markets. Arguably, this measure may well reduce external demand/market volatility or shocks, enhance competitiveness and accelerate foreign earnings for grape wine producers, and traders in the country.*

Key words: Area Harvested · Czechia· Export · Import· Yield

JEL Classification: Q10 · Q15 · Q17

1 Introduction

Grape (vitis vinifera) as a kind of fruit, deciduous woody vines that grow in clusters, is industrial product widely planted by both smallholder and large-scale farmers worldwide. Globally, the fruit is substantially used for winemaking. The product is also eaten fresh or used for raisins, juice, vinegar, jelly, seed oil, and seed extract. Czech Republic (Czechia) is widely well-known for wine and beer production, and consumption. The most important input (plant) used for winemaking in the Czech Republic are grapes, substantially grown in the South Moravian region of the country (Žufan, 2004; Hejmalová and Šperková, 2011; Kučerová, 2014; Syrovátka, Chládková and Žufan, 2015), thus, Czech wine is widely referred to as Moravian wine. Prior to the Czechia joining the European Union (EU), there were high expectations that all facets of agricultural activities, such as grape production would be improved. Wine grape industries, and small holder farmers expected that date with a specific strategic hope, that through the EU Common Agricultural Policy (EU CAPs), their productivity and competitiveness would be intensified (Tomsik, 2002). Similarly, after accession in 2004, the total acreage of vineyards steadily improved. The structure of the grape wine on and industry changed in the positive direction. In 2004, the applicants for subsidies received 25,423 thousand CZK, and the amount increased to 78,662 thousand CZK in 2009/2010 (Sedlo and Tomsik, 2012). Nonetheless, grape out in Czechia has not substantially improved as expected, implying that there are factors that have undermined its development.

Various factors may well impact grape production, and those factors vary from region to region within a nation or nation to nation, their unique denominator is the aspects of nature. Grapes are specifically sensitive to climate change because of the intrinsic connection between the climate and its features. The climate change would affect the quality of grapes produced (Berli et al., 2008; Webb, Whetton and Barlow, 2008; de Orduna, 2010; Vlahović, Potrebić and Jeločnik, 2012; van Leeuwen and Darriet, 2016), as well as the quantity, yield per hectare (Bindi et al., 1996; Bock et al., 2013; Mozell and Thach, 2014; Petrović, Krstić and Stanišić, 2015; Fraga et al., 2016), frost injury and ice damage, diseases, labour cost and availability (Centinari et al., 2016), technology, consumption patterns (Žufan, 2004), and price in countries such and the Czech Republic and Slovakia (Tomsik et al., 2016). Although previous studies have attempted to underline that factors that influence grape cultivation and output in countries, recent descriptive studies on this topic is needed, thus, the rationale for this study. This study is an attempt to add to the available body of research related to grape wine performance in Czechia. This current study aimed at assessing position of Czechia in grape wine production and trade with reference to other major producing economies. The study also aimed at highlighting the possible prospects and challenges of the sector in the country in recent decades. This article is structured as follows: part 1 presents an introduction, part 2 presents methods, while part 3 presents descriptive analysis. Finally, part 4 concludes the study and profiles some recommendations.

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2 Methods

The statistical data for the study are obtained from the reputable organizations as follows: Food and Agriculture Organization of the United Nations (FAOSTAT); Czech Statistical Office (CSO); and International Trade Centre (ITC). The study is both descriptive in nature. The descriptive analysis for the period 1993-2016 as presented in tables, figures and percentages shows the trends in grape wine production, trade, and consumption in the Czech Republic.

3 Research results

3.1 Grape and wine production

Area harvested: Grapes as integral agrarian input in winemaking, its global area harvested, rather than increase, slowly declined from 7.6 million hectares in 1993 to 7.1 million hectares in 2014. Notwithstanding, except for the EU (or Europe as a whole), area harvested in China, the USA, Asia, Africa and Americas increased within the period under study. Grape cultivation in the EU substantially decreased from 4.3 million hectares (or 56.2% of the world cultivated) in 1993 to 3.2 million hectares (or 44.7% of the world cultivated) in 2014 (Table 1). The downward trend is partially because of the EU's CAP effort to curtail overproduction of the product.

Despite the downward trend in Europe in general, and Spain, in particular, the country (Spain) has been the largest cultivator of grape in the world regarding area harvested (13% of global cultivated), but was the second largest producer of the product in raw quantity output (9.3% of the world cultivated) in 2014 (Table 1 and Table 2). It implies that China, France, Italy, and Spain are the largest producers of grapes partly owing to their large farms relative to other producing economies. Although the grape area planted in Czechia has been far below the largest producers, and has been fluctuating over the years, the country's area harvest increased from 11 thousand hectares in 1993 to 16 thousand hectares in 2010, before slightly sliding to less than 16 thousand hectares in 2014. Similarly Czech share (% of global area harvested) slightly rose from 0.15% in 1993 to 0.23% in 2010, and then declined to 0.22% in 2014. On the hand, Slovakia drastically reduced from about 27 thousand hectares in 1993 to about 9 thousand in 2014 (Table 1).

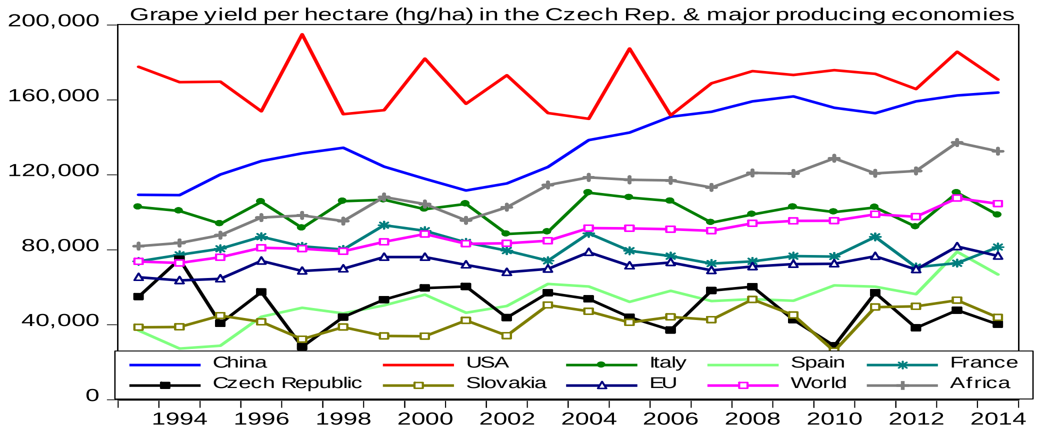
Table I Grape area harvested (ha, '000) and global share (%) in the CR and some leading producers in 2014

Year/ economy	1993		2000		2005		2010		2014	
	ha	Share	ha	Share	ha	Share	ha	Share	ha	Share
Spain	1,235.0	16.3	1,167.7	15.9	1,161.4	15.8	1,002.1	14.2	931.1	13.1
China	139.0	1.8	286.1	3.9	411.3	5.6	555.1	7.9	770.1	10.8
France	902.0	11.9	861.0	11.7	854.8	11.6	771.5	10.9	757.9	10.6
Italy	948.3	12.5	872.7	11.9	793.0	10.8	777.5	11.0	702.9	9.9
Turkey	567.0	7.5	535.0	7.3	516.0	7.0	477.8	6.8	467.1	6.6
USA	307.5	4.1	383.0	5.2	378.3	5.1	385.2	5.5	418.6	5.9
Czechia	**11.1**	**0.15**	**11.2**	**0.15**	**14.2**	**0.19**	**16.0**	**0.23**	**15.8**	**0.22**
Slovakia	26.8	0.35	17.5	0.24	13.1	0.18	8.2	0.12	8.8	0.12
World	7,574.3	100.0	7,337.5	100.0	7,373.0	100.0	7,047.8	100.0	7,124.5	100
Americas	768.8	10.1	872.8	11.9	909.9	12.3	957.6	13.6	1,003.8	14.1
Africa	315.7	4.2	308.1	4.2	336.0	4.6	325.4	4.6	350.2	4.9
Asia	1,638.4	21.6	1,660.4	190.2	1,788.1	24.3	1,832.1	26.0	2,100.3	29.5
Europe	4,787.1	63.2	4,375.4	59.6	4,164.8	56.5	3,735.5	53.0	3,498.6	49.1
EU	4,256.2	56.2	3,979.2	54.2	3,778.4	51.2	3,391.3	48.1	3,181.4	44.7

Source: Own processing based on FAOSTAT. Notes: share= proportion (% of global area harvested)

Yields: In terms of yield per hectare, data available from FAO (2017) indicate that, Vietnam recorded highest in grapes yield (hectogramme per hectare) in the world, followed by Egypt, India and Peru, while the USA recorded 9th, China 11th, Italy 32nd, France 43rd and Spain 52nd positions in the world in 2014. As presented in Table 1, and Figure 1, some of these countries, among the leading producers of grapes not only due to their yields per acre, but also area harvested, where the reverse has been the case in Slovakia (70th) and the Czech Republic (75th). Generally, in advanced economies, grape yield per hectare has increased as a result of efficient use of advanced technologies coupled with modern farm inputs. Surprisingly, grape yield per hectare in Czechia and Slovakia is below not only the EU levels, but also the world and African averages. Given that these countries are also advanced not just economically, but also in agriculture, it is rather surprising that their performance with regards to yield per hectare has lagged behind global and African averages. Why this sluggish performance? Soil fertility and climate change have been identified as among the constraints militating yield per hectare (Bindi et al., 1996; Bock et al., 2013; Fraga et al., 2016) in Czechia (Sedlo and Tomsik, 2012). Sadly, grape farmers hardly receive any compensation when their output falls due to adverse weather conditions (Tomsik et al., 2016). Nevertheless, looking at area harvested, Czechia and Slovakia still have a great prospect to increase annual production for domestic consumption, earnings and competitiveness.

Figure 1 Grape yields (hg/ha) in Czechia and some leading producing countries, 1993-2014



Source: Own processing based on FAOSTAT

Grape output: The global grape output rose from about 56 million tonnes in 1993 to 74.5 million tonnes in 2014. This upward trend has been recorded partly because of the high demand for the product in both cultivating and consuming economies. Despite the numerous challenges that grape farmers have faced, the fruit crop is still a major input for wine and fruit juice processing not just in the Czech and Slovakia Republics, but also in other producing and importing countries. The statistical evidence also shows that even though the EU share of grape production dwindled from about 50% (28 million tonnes) of global grape output in 1993 to about 33% (24 million tonnes) in 2014, it is still substantial as it is up to 1/3 of the world's output (Table 2). As earlier pointed out, it is important to reiterate that EU's production and competitiveness in the world fluctuated partly because of its agrarian measures, via Common Agricultural Policy (CAPs), which to some extent attempts to curtail/reduce (control overproduction) or stabilize (or increase) some agrarian production, such as grape. Also, under the auspices of the WTO, the EU CAPs (Czech included) has been compelled to reduce domestic support to its producers and export subsidies that distort global agricultural market signals.

Table 2 Czechia, Slovakia and five major global grape producers (quantity, tonnes, '000) in 2014

Year/ economy	1993			2000			2008			2010			2014		
	Qty	Rank	Share	Qty	Rank	Share	Qty	Rank	Share	Qty	Rank	Share	Qty	Rank	Share
China	1,520	8	2.72	3,373	6	5.20	7,236	2	10.73	8,652	1	12.85	12,628	1	17.0
USA	5,464	3	9.78	6,974	3	10.75	6,640	3	9.84	6,778	3	10.07	7,152	2	9.60
Italy	9,750	1	17.46	8,870	1	13.68	7,793	1	11.55	7,789	2	11.57	6,931	3	9.30
Spain	4,568	4	8.18	6,540	4	10.08	5,952	5	8.82	6,108	4	9.07	6,223	4	8.35
France	6,657	2	11.92	7,763	2	11.97	6,019	4	8.92	5,894	5	8.75	6,173	5	8.29
Czechia	**61.10**	**53**	**0.11**	**66.94**	**53**	**0.10**	**98.32**	**53**	**0.15**	**45.92**	**59**	**0.07**	**63.53**	**56**	**0.09**
Slovakia	103.50	49	0.19	59.37	58	0.09	51.62	58	0.08	21.12	69	0.03	38.45	63	0.05
World	55,853	-	100	64,849	-	100	67,455	-	100	67,325	-	100	74,500	-	100
Asia	11,742	-	21.0	14,541	-	22.4	18,974	-	28.1	20,089	-	29.8	26,378	-	35.4
Americas	10,271	-	18.4	13,124	-	20.2	14,134	-	21.0	14,316	-	21.3	14,841	-	19.9
Europe	30,418	-	54.5	32,576	-	50.2	27,814	-	41.2	26,781	-	39.8	26,636	-	35.8
EU	27,811	-	49.8	30,304	-	46.7	25,546	-	37.9	24,621	-	36.6	24,400	-	32.8

Source: Own processing based on FAOSTAT. Notes: Rank= global ranking; share= proportion (% of global production)

Just as the EU's sluggish performance, the volume of grape output in the Czechia and Slovakia also steadily declined from 164.6 thousand tonnes or accounting for 0.33% (Czechia 0.11% and Slovakia 0.19%) of global output in 1993 to about 102 thousand tonnes or accounting for 0.14% (Czechia 0.09%, and Slovakia 0.05%) of global quantity production in 2014 (Table 2). This shows that the trend in grape output and the positions of these two countries in the world have changed tremendously in the opposite direction during the period under study. Nonetheless, Czech performance has surpassed Slovakia during the period under review.

Wine production: Global wine production rose from about 26 million tonnes in 1993 to over 29 million in 2014. Notwithstanding, as experience in grape output, even though the Italy, Spain and France recorded as the first, second, third largest wine producers in the world their annual output declined during the period under review. As earlier mentioned, this is partly attributed to the EU's effort to curtail overproduction of the production. Although Czechia ranked 30th in Wine production in the world, it's annual wine output has steadily increased, albeit at a slow pace, global share has remained the same (Table 3). Also, given that Czechia is a net importer (Table 4 and Table 5), there is a need for the country to intensify its production to meet domestic demand and export.

Table 3 Czechia, Slovakia and top wine producers (tons, share) in the world in 2014

Indicators		1993		2010		2014	
Rank	Economy	tonnes	share	tonnes	share	tonnes	share
1	Italy	6,267,160	24.20	4,469,318	16.54	4,796,600	16.48
2	Spain	2,650,700	10.24	3,610,000	13.36	4,607,850	15.83
3	France	5,331,440	20.59	4,531,671	16.77	4,293,466	14.75
4	USA	1,944,100	7.51	2,711,000	10.03	3,300,000	11.34
5	China	500,000	1.93	1,600,000	5.92	1,700,000	5.84
30	**Czechia**	**45,490**	**0.18**	**46,276**	**0.17**	**52,000**	**0.18**
36	Slovakia	56,050	0.22	27,785	0.10	32,527	0.11
	World	25,895,265	100	27,028,149	100	29,105,841	100

Source: Own processing based on FAOSTAT. Notes: Rank= global ranking; share= % of global output

3.2 Grape wine trade

Historically, Slovakia and Czechia has experienced intra-industry trade in wine products, as both countries have been the largest trading partner with one another (Kučerová, 2014). Nonetheless, wine trade between the two economies has not been solely depended on domestic production. Evidence from studies have proven that imported wine varieties to these countries are re-exported (Tomsik and Sedlo, 2013). Table 4 presents the top export destinations for Czech and Slovak wine of fresh grapes (2204) in 2016. Slovakia, Poland, China, and Germany, accounted as the leading wine of fresh grapes importing countries from the Czechia. A critical look at the export destination shows that Czechia is concentrated in only two countries, Slovakia 43% and Poland about 27% (or 60% in both countries). Arguably, the vulnerability of Czechia to shocks within its destination partners has been intensified. This might be partially the reason why the average export growth rate (quantity) for the period 2012-2016 was -23% in the country.

Table 4 Top importing markets for wine of fresh grapes (2204) from Czechia in 2016

Economy/ Indicator	Export 2016 ($ '000)	2016 ($	Share in exports (%)	Qty (tonnes) exported 2016	Export growth-value 2012-16 (%)	Export growth- qty 2012-16 (%)	Export growth-value 2015-16 (%.)	Average tariff faced (%)
World	25,647	-173,976	100	10,957	-12	-23	-13	-
Slovakia	11,088	2,903	43.2	6,583	-24	-30	-39	0
Poland	6,839	6,828	26.7	2,496	13	11	73	0
China	1,524	1,509	5.9	53	0	-26	1,261	14.7
Germany	1,238	-17,435	4.8	382	161	233	-26	0
Switzerland	840	821	3.3	60	123	112	-45	13.4

Source: Own processing based on ITC trade map

Table 5 Top supplying markets for wine of fresh grapes (2204) imported by Czechia in 2016

Economy/ Indicator	Import 2016 ($ '000)	Bal. 2016 ($ '000)	Share in imports (%)	Qty imported 2016	Import growth-value 2012-16 (%)	Import growth-qty 2012-16 (%)	Import growth-value 2015-16 (%.)	Average tariff faced (%)
World	199,623	-173,976	100	170,079	-4	2	3	-
Italy	50,343	-50,308	25.2	46,283	-4	1	12	0
France	36,489	-36,484	18.3	9,455	-7	-1	5	0
Spain	28,211	-28,043	14.1	43,206	4	16	-10	0
Germany	18,673	-17,435	9.4	10,018	9	11	6	0
Hungary	18,461	-17,735	9.2	21,704	7	15	-1	0

Source: Own processing based on ITC trade map

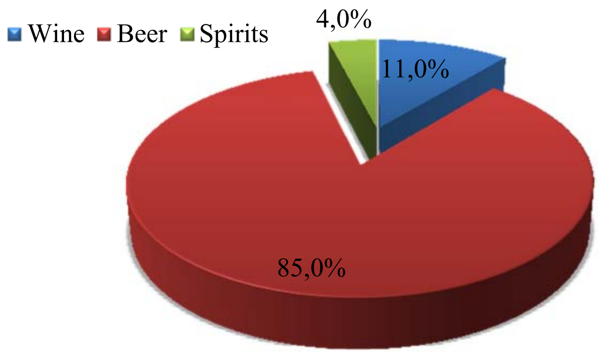
On the other hand, supplying markets for wine of fresh grapes (2204) imported by Czechia in 2016 as presented in Table 5 shows that wine imported into the country was also concentrated in 5 countries (76.2% of total imports), albeit more diversified than export destinations. Also, Czechia has been substantially a net importer of wine of fresh grapes. For instance, in 2016 the country exported $25,647- imported $199,623= -$173,976, or exported 10,957 (tonnes) - imported 170,079 (tonnes) = -159,122 (tonnes). Arguably, Czechia could be classified as a wine consuming nation rather than a producing nation, as the country's imports largely outweigh exports.

The growth potential of demand and the market size are the factors that drive the attractiveness of the Czech wine markets (Kučerová, 2014). Nevertheless, there is a need for market diversification beyond the European borders to reduce global market shocks, stimulate competitiveness, and for more earnings to be ensured. Although there is a market access to wine trade within the EU borders, non-EU countries charge import duties (Table 4 and Table 5). Arguably, this partially impeded the Czechia from penetrating, non EU countries. Also, Czech export growth rate drastically decreased during the period 2012-2016, while quantity import growth increased within the same period under study.

3.3 Wine consumption in the Czech Republic

Wine, as known beverage left deep traces in tradition of several nations, and the way it is consumed, very often reflects the culture, customs and lifestyles of local communities across the globe, especially in non-Muslim regions. Besides health benefits, wine is very often symbol and sign of prestige, especially within wealthy consumers, and its' consumption is influenced mostly by tradition, confession, habits and level of life standard (Vlahović, Potrebić and Jeločnik, 2012). Similarly, the consumption of beer and wine in Czechia could be historically considered traditional (Syrovátka, Chládková and Žufan, 2015). Implying that the demand for production and consumption might be sustained.

Figure 2 Structure of consumption of alcoholic beverages in Czechia in 2015



Source: Czech Statistical Office, 2016

Wine Consumption in Czechia has grown, but also fluctuated over the years. For instance, consumption per capita in the country increased from 15.4 litres per capita in 1995 (Syrovátka, Chládková and Žufan, 2015) to 19.84 litres per capita in 2012, but declined to 18.9 litres per capita in 2015 (Table 6). Also, Syrovátka, Chládková and Žufan (2015) analyse the development of consumer demand for wine in Czechia using elasticity coefficients derived from the constructed dynamic model for the period 1948–2012, and their result show a linear trend in the development of demand for wine in the country.

Table 6 Consumption of alcoholic beverages and cigarettes (annual per capita averages), 2007-2015

Indicators	Unit measured	2007	2008	2009	2010	2011	2-12	2013	2014	2015	Index 2015/2014
Alcoholic beverages	litre	185.8	183.2	177.6	170.9	168.8	175.2	172.3	173.3	172.4	99.5
Spirits (40%)	litre	8.2	8.1	8.2	7.0	6.9	6.7	6.5	6.7	6.9	102.5
Wine	**litre**	**18.5**	**18.5**	**18.7**	**19.4**	**19.4**	**19.8**	**18.8**	**19.5**	**18.9**	**96.9**
Grape-based wine	litre	16.1	16.3	16.5	17.3	17.3	17.5	16.2	16.6	16.4	98.7
Non-grape based wine	litre	2.4	2.2	2.2	2.1	2.1	2.3	2.6	2.9	2.5	86.6
Beer	litre	159.1	156.6	150.7	144.4	142.5	148.6	147.0	147.0	146.6	99.7
cigarettes	ks	2,345	2,107	2,071	2,028	1,988	1,947	1,904	1,950	2,010	103.1

Source: Czech Statistical Office, 2016

Between 2014 and 2015, the overall consumption of alcoholic beverages in Czechia declined by 0.8 litres (-0.5%); beer and wine consumption declined by 0.4 litres (-0.3%) and 0.6 litres (-3.1%), respectively. On the other hand, spirits consumption (40%) increased by 0.2 litres (+2.5%), and cigarettes consumption rose by 60 pieces (+3.1%) within the same period. The overall consumption of alcoholic beverages in terms of pure alcohol in the country reduced by 0.4 litres (-3.7%) due to decrease consumption of wine and beer (Table 6) in the country (Czech Statistical Office, 2016).

Globally, Czechia has been the highest consumer of beer per capita in the world, and beer has been the country's domestic drink (Slováčková, Birčiaková and Stávková, 2016). Czechia was ranked 28th position in the global wine consumption, with 0.81% (of quantity global consumption) in 2015 (Wine Institute, 2017). The structure of alcohol consumption in the Czechia as shown in Figure 2 and Table 6, even though beer consumption has been recorded highest, wine consumption has increased, but slowdown in 2015. Also, the substantial negative trade balance in grape wine (both in monetary values and quantity) shows that the relevance and demand for the product in the country cannot be overemphasized. Arguably, more wine production is needed to meet domestic consumption, and reduce pressure on the foreign exchange or trade balance.

4 Conclusions

Given that grape is a key agrarian input for wine production in Czechia, and wine is largely produced in the Moravia region and consumed across the country, this article attempts to assess the performance or trends of its production and trade in recent decades. The study is descriptive in nature. The descriptive findings suggest that the grape area harvested, yields, prices, winemaking and consumption may have implications on production and trade in Czechia.

Statistical data show that grape yields in Czechia have been below the EU, Africa and global averages. Also, Czech wine export (of fresh grapes) has been highly volatile as it has been concentrated only in two economies that shared border with the country. Similarly, the country has been a net importer of wine as consumption outweighs production, implying that the demand for wine product is more than domestic production. Export promotion should be encouraged and diversified beyond the EU markets. Arguably, this measure may well reduce external demand/market volatility or shocks, enhance competitiveness and accelerate foreign earnings for grape wine producers, and traders in the country.

References

Anchor, J. R., & Lacinová, T. (2015). Czech wine consumers: maturing with age? *E+ M Ekonomie a Management*, (1), 169-182. doi.org/10.15240/tul/001/2015-1-013

Berli, F., D'Angelo, J., Cavagnaro, B., Bottini, R., Wuilloud, R., & Silva, M. F. (2008). Phenolic composition in grape (Vitis vinifera L. cv. Malbec) ripened with different solar UV-B radiation levels by capillary zone electrophoresis. *Journal of Agricultural and Food Chemistry*, 56(9), 2892-2898. doi: 10.1021/jf073421

Bindi, M., Fibbi, L., Gozzini, B., Orlandini, S., & Miglietta, F. (1996). Modelling the impact of future climate scenarios on yield and yield variability of grapevine. *Climate research*, 213-224. doi: doi.org/10.3354/cr007213

Bock, A., Sparks, T. H., Estrella, N., & Menzel, A. (2013). Climate-induced changes in grapevine yield and must sugar content in Franconia (Germany) between 1805 and 2010. *PloS one*, 8(7), e69015. doi: doi.org/10.1371/journal.pone.0069015

Centinari, M., Kelly, K.M., Hed, et al. (2016). Assessing growers' challenges and needs to improve wine grape production in Pennsylvania. Journal of Extension, 54(3), 1-8.

Czech Statistical Office. (2016). *Food consumption*. [online]. [cit. October 10-10-2017]. Available from: http://bit.ly/2AV3BqV.

De Orduna, R. M. (2010). Climate change associated effects on grape and wine quality and production. *Food Research International*, 43(7), 1844-1855. doi: doi.org/10.1016/j.foodres.2010.05.001

FAO (2017). *FAOSTAT database* [online]. [cit. 10-06-2017]. Available from: http://bit.ly/2iBrcUH.

Fraga, H., García de Cortázar Atauri, I., Malheiro, A. C., & Santos, J. A. (2016). Modelling climate change impacts on viticultural yield, phenology and stress conditions in Europe. *Global change biology*, 22(11), 3774-3788. doi: 10.1111/gcb.13382

Hejmalová, H., & Šperková, R. (2014). Assessment of attractiveness of the wine-production industry in the Czech Republic. *Acta Universitatis Agriculturae et Silviculturae Mendelianae Brunensis*, 59(2), 89-98. doi: doi.org/10.11118/actaun201159020089

ITC (2017). *Statistical database* [online]. [cit. 05-06-2017]. Available from: http://bit.ly/1EowRPT.

Kuáerová, R. (2014). Factors of the attractiveness of Slovak wine market and their influence on the Czech wine export to Slovakia. *Agricultural Economics/Zemedelska Ekonomika*, 60(9), 430–439.

Mozell, M. R., & Thach, L. (2014). The impact of climate change on the global wine industry: Challenges & solutions. *Wine Economics and Policy*, 3(2), 81-89. doi: doi.org/10.1016/j.wep.2014.08.001

Petrović, J., Krstić, B., & Stanišić, T. (2015). Analysis of production potential and competitive position of Serbia on the international wine market. *Economics of Agriculture*, 62(3), 813-829. doi: doi.org/10.5937/ekoPolj1503813P

Sedlo, J., & Tomšík, P. (2012). Strategic development of varietal vineyards in the Czech Republic. *Acta Universitatis Agriculturae et Silviculturae Mendelianae Brunensis*, 60(2), 325-334. doi: doi.org/10.11118/actaun201260020325

Slováčková, T., Birčiaková, N., & Stávková, J. (2016). Forecasting alcohol consumption in the Czech Republic. *Procedia-Social and Behavioral Sciences*, 220, 472-480.

Syrovátka, P., Chládková, H., & Žufan, P. (2015). Consumer demand for wine and beer in the Czech Republic, and their mutual influences. *Acta Univ. Agric. Silvic. Mendelianae Brun.*, 63(6), 2119-2125. doi: doi.org/10.11118/actaun201563062119

Tomšík, P. (2002). Enviromental analysis in the winergrowing industry. *Agricultural Economics–Czech*, 48(7), 298-302.

Tomšík, P., & Sedlo, J. (2013). Management of wine production with regard to its implementation into the wine markets of the Czech Republic. *Agricultural Economics/Zemedelska Ekonomika*, 59(5), 202-210.

Tomsik, P., Stojanova, H., Sedlo, J., & Vajcnerova, I. (2016). Factors of profitability of the grapes production. *Agricultural Economics*, 62(6), 292-297. doi: 10.17221/258/2015-AGRICECON

van Leeuwen, C., & Darriet, P. (2016). The impact of climate change on viticulture and wine quality. *Journal of Wine Economics*, 11(1), 150-167. doi:10.1017/jwe.2015.21

Vlahović, B., Potrebić, V., & Jeločnik, M. (2012). Preferences of wine consumers on Serbian market. *Economics of Agriculture*, 59(1), 37-49.

Webb, L. B., Whetton, P. H., & Barlow, E. W. R. (2008). Climate change and winegrape quality in Australia. *Climate Research*, 36(2), 99-111. doi: 10.3354/cr00740

Wine Institute. (2017). *World wine consumption by country* [online]. [cit. 10-06-2017]. Available from: http://bit.ly/1vRkISz.

Žufan, P. (2004). Czech wine–production industry and recent movement forces. *Agricultural Economic–Czech*, 50(9), 400-404.