

International market structure and competitiveness at the malted beer: from 2003 to 2012

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Abstract: Barley malt beer is the world's most consumed alcoholic drink and its industry represents a multibillion dollar international trade. The paper's main goal is to contribute with the analysis of this industry in terms of its international competitiveness and market structure. It utilizes the data regarding exports and imports for malted beer available in the International Trade Centre's Trade Map database and it refers to the period of ten years (2003–2012). The method used to expose the industry's competitiveness and market structure consisted in the calculation of (i) Revealed Comparative Advantage (RCA); (ii) Relative Position of Market (RPM); (iii) Hirschman-Herfindahl index (HHI) and (iv) Net Export Index (NEI). The findings show a high concentration for both the import and export markets and the detainers of the largest shares are: (1) the United States of America for imports and (2) Mexico, the Netherlands, Belgium and Germany for exports. It was possible to identify the players in the market structure based on exporters, importers and both importers and exporters, stressing their position in the market.

Key words: international market structure, international competitiveness, malted beer

Beer has been around for so long that is difficult to be precise regarding when its consumption/production began (Horsey 2003; Tremblay et al. 2005). Beer consumption dates to the Ancient Egypt and Mesopotamia and it is related to the cereals production growth. Numerous brewing techniques were developed throughout the centuries (Tremblay et al. 2005). It is acceptable to say, therefore, that beer is a day-by-day beverage from the way back in time, and barley malt beer is the world's most consumed alcoholic drink at present (Horsey 2003; Tremblay et al. 2005).

Brewing is a multibillion dollar world trade. In 2010, its export numbers were up to more than US\$ 10 billion worldwide (ITC 2013). It is an extremely competitive industry and huge players such as the Anheuser-Busch or Heineken, which detain the large market shares in the USA and the Netherlands, respectively (Nield and Peacock 1995). Competition by those and other firms in the foreign markets also provides a dynamic and even ferocious framework (Goldberg and Knetter 1999).

The past decades shown that mergers are constant among these huge players and their repercussions are notable (Geppert et al. 2013). That makes the status quo to be reshaped in some local markets for beer and the market structures also are under processes

of change, as seen in the UK by the beginning of the previous decade (Pinkse and Slade 2003).

Therefore, analysing the barley malt beer industry and its market structures is interesting for the academic world. The paper's main goal is to analyse this industry regarding its: (1) international competitiveness and (2) international market structure.

THEORETICAL BACKGROUND AND METHOD

Competitiveness can be studied by multiple views. This paper uses the definition proposed by Latruffe (2010) in which it is the capacity to face competition and obtain success. Success could be analysed on different levels, such as: firm, sector or nation. By a strict agribusiness view, competitiveness is a description for the capability of maintaining a firm, sector or nation competitive. Which could be considered as the ability to protect or even to better its position towards competition (Drescher and Maurer 1999; Gallagher et al 2006; Bojnec and Fertő 2009; Latruffe 2010)?

Since the concept of competitiveness reaches out to three different levels, its analysis is also segmented: (i) microeconomic (firm), (ii) mesoeconomic (sector)

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and (iii) macroeconomic (nation). With that in mind, the discussion will be undertaken on the mesoanalytic level, involving the barley malt beer.

There are different indicators for a mesoanalytic view, according to Horn (1985). The trade theory says that a nation's competitive edge on specific sectors should be guided by the comparative advantage, according to Ricardo and Heckscher-Ohlin. The comparative advantage says that the trade flows are the result of the efficiency differences in resource allocation among other nations. It concludes that the nations should specialize their production sectors of specific products for which they would have a greater efficiency (Horn 1985; Bojnec and Fertő 2009).

One of the most often used indicators of the competitive edge on the international basis is the Revealed Comparative Advantage (RCA). The RCA was initially created by Balassa (1965) and modified by Vollrath (1991) to avoid any doubled registers for the country pairs. It is sustained by exports. The index reveals the relation between the coefficients of participation of a nation's exported product i and its total flow of exports, and the coefficient of participation of the world's exported product i and the total flow of exports worldwide, in the same period. Mathematically:

$$RCA = \frac{\left(\frac{X_{ip}^t}{X_{tp}^t} \right)}{\left(\frac{X_{im}^t}{X_{tm}^t} \right)}$$

where:

RCA = revealed comparative advantage

X_{ip}^t = exports of the product i of the country in the period t

X_{tp}^t = exports of the country in the period t

X_{im}^t = exports of the product i in the world in the period t

X_{tm}^t = exports in the world in the period t

The higher the final index, the higher is the nation's revealed comparative advantage. The lower the final index is, the higher is the disadvantage (Vollrath 1991; Bojnec and Fertő 2009).

Along with the RCA, the Relative Position of Market (RPM) is relevant. It is used to determine a nation's position in the international trade of a specific product and it is shown through the coefficient between the nation's trade balance for the product i and the total trade for the same product (Lafay et al 1999). Mathematically:

$$RPM_i^t = 100 \times \frac{X_i^t - M_i^t}{W_i^t}$$

where:

RPM_i^t = relative position of the market

X_i^t = exports of the product i of the country in the period t

M_i^t = imports of the product i of the country in the period t

W_i^t = global commercialization (exports and imports added) of the product i in the period t

This index follows the same pattern as the previous one, in which the higher its value, the higher is the nation's relevance in the international trade for the specified product, which in this case, reveals a greater position in the market.

Beyond the RCA and RPM indexes, the Industrial Organization as seen by Hansen and Wernerfelt (1989) is a useful framework for researchers whose interest lies upon the influence of the market structure over performance (Porter 1985, 1979).

The researchers' studies mentioned above, even not making a direct mention, relate to Bain (1951) when it comes to analysing the relations between the market structure (as market concentration) and exercising the market power. Exercising the market power has become a relevant subject for some economists and policy makers, as well for the firms researchers because this issue impacts the performance of firms/sectors and even countries.

The structure-conduct-performance (SCP) paradigm is the most notable view related to the previous theoretical background. According to the SCP, a larger market concentration implies that those with the bigger market shares explore the exercise of their market power so that their profits are higher (Bain 1951; Prescott et al. 1986).

Market concentration is explained by Scherer (1980) as the union of the bigger market shares of a specific sector. It is applicable to the international business, as shown by Xie et al. (2011) and Thomé et al. (2012).

A high market concentration is understood as few competitors detaining a larger portion of that market (Bresnahan 1989), while the rest and the majority of them will be operating in the rest of the market. On the other hand, a low market concentration implies a great number of competitors in equal conditions.

Market concentration is an important aspect of the market structure in which the firms/countries find themselves; it has impacts upon their performances (Porter 1979, 1985; Prescott et al. 1986; Bresnahan 1989). This is also reinforced by Van Kranenburg et al. (2002) by saying that the market concentration can reflect the nations' competitive positions in a

specific sector. These authors mention that the market concentration is a relevant performance inductor. This was also perceived in the beef sector by Thomé et al. (2012).

A solid measure technique to analyse market concentration is needed (Hall and Tideman 1967). Iwasaki et al. (2008) agree with it and say that concentration measures should take the nations' international market share, individually. This could be expressed in a number of ways and should consider inequality on international market shares and the number of competitors (nations). Therefore, concentration is basically the group of nations that own the bigger share of a specific market.

One particular equation that could reveal the market concentration is the Hirschman-Herfindahl index (HHI) (Iwasaki et al. 2008). Mathematically:

$$HHI = \sum_{i=1}^n S_i^2$$

where:

HHI = Herfindahl-Hirschman Index

S_i^2 = Market share squared

n = total countries in the sector

Along with the HHI, another equation could enlighten the competitive conducts for the international trade and this one refers to the import/export flow for a specific product. It is the Net Export Index (NEI) (Banterle and Carresi 2007), which basically takes the coefficient for the nation's trade balance for the product i and the total trade for the same product. Mathematically:

$$NEI_i^t = \frac{X_i^t - M_i^t}{W_i^t}$$

where:

NEI_i^t = the net export index

X_i^t = exports of the product i of the country in the period t

M_i^t = imports of the product i of the country in the period t

W_i^t = the commercialization (exports and imports added) of the product i of the country in the period t

The NEI oscillates between -1 (meaning the nation just imports the product) and 1 (meaning the nation just exports the product). In between those, when a nation reaches zero, it means the country does both, imports and exports the product.

Utilizing indexes is a relevant way for a better understanding about the international trade for a prod-

uct (Bojnec and Fertő 2009; Drescher and Maurer 1999; Thomé et al. 2012; Thomé and Vieira 2012). Data utilized by this paper was extracted from the International Trade Centre (ITC) database. The period is from 2003 to 2012. The ITC is a subsidiary organization of the World Trade Organization (WTO) and the United Nations (UN) with the purpose to provide trade reports and the technical assistance for developing countries (ITC 2013).

RESULTS AND DISCUSSION

In order to apply the methodology described above, it was necessary to identify the greatest international players in the malted beer sector. This identification was able thanks to the International Trade Centre (ITC) database, measured by US Dollar thousand. The identification of the greatest importers and exporters follows:

Importers

Data concerning importers is expressed by Figure 1 and Table 1. There are mainly developed countries (the United States of America, the United Kingdom, Italy, France, Germany, Belgium, the Netherlands, Ireland, Spain, Australia, Canada), contrasting with developing nations (the Russian Federation, Angola). Figure 1 reveals the import volume of 13 biggest importers of malted beer.

The USA are the greatest importers for malted beer. As seen in Figure 1, its imports are outstanding when compared to other buyers. From the beginning to the end of the analysed timeline, the USA hold the largest portion for this market. Tremblay and Tremblay (2005, p. 9) remind that the USA have a "major beer drinking" profile, along Ireland and the Czech Republic. The per capita beer consumption in the USA was about 22.0 gallons in 2001 (Tremblay et al. 2005). It is the homeland for the brewing company Anheuser-Busch that along with the InBev forms the world's current largest brewing company.

Figure 1 reveals two major groups for malted beer imports, besides the United States. These groups are separated by a relatively small difference in the terms of beer imports (US Dollar thousand). None of them reached the mark of 1 million (US Dollar thousand). The discussion will be concerned about the relevant nations in the first group.

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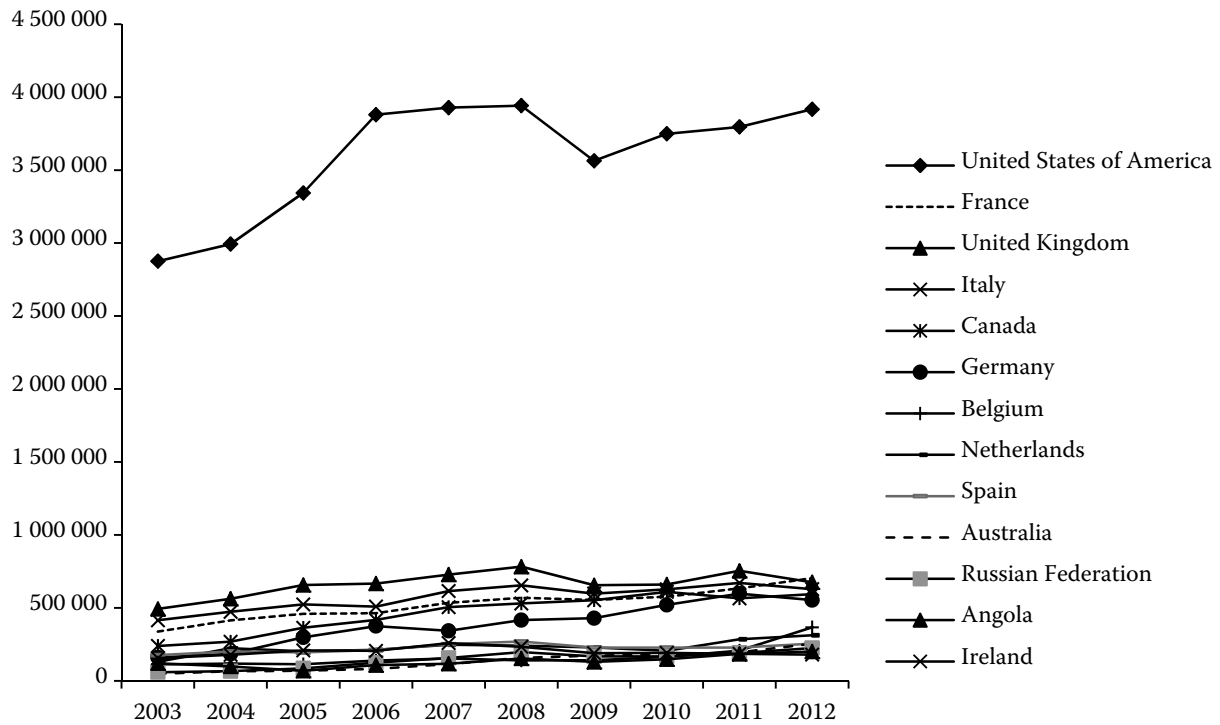


Figure 1. Top 13 importers (US\$) for malted beer, 2003–2012

The nations in the first group and the next biggest malted beer importers are: France, the United Kingdom, Italy, Canada and Germany, and the data reveal basically that all of them were affected by the financial crisis that took place in 2009, meaning that the United Kingdom registered a slight decrease while the rest of them were relatively “on

the same page”, slightly above the 500 000 (US Dollar thousand) mark.

Next to the USA, the UK is the second biggest importer for malted beer. Its imports were stable through the analysed timeline and its annual average growth was similar to the USA, at 3.70%. When compared to other European countries, such as France

Table 1. Annual average growth (US\$) for the Top 13 malted beer importers

	2003	2012	Difference	Annual average growth (%)
USA	2 875 810	3 917 068	1 041 258	3.62
France	338 243	703 990	365 747	10.81
UK	493 559	676 348	182 789	3.70
Italy	415 379	628 959	213 580	5.14
Canada	239 861	594 121	354 260	14.76
Germany	160 746	553 992	393 246	24.46
Belgium	113 508	367 590	254 082	22.38
Netherlands	130 741	312 944	182 203	13.93
Spain	176 942	255 874	78 932	4.46
Australia	48 483	254 540	206 057	42.50
Russian Federation	60 033	225 514	165 481	27.56
Angola	121 106	201 277	80 171	6.61
Ireland	155 566	180 490	24 924	1.60

or Germany, the nation's total draft sales account for almost three times their comparable percentages (Pinkse and Slade 2003). The UK also was susceptible to changes in its beer market in terms of the major mergers and, consequently, an increase in its market concentration (Pinkse and Slade 2003).

Exporters

The min malted beer exporters through analysed timeline are: the Netherlands, Mexico, Germany, Belgium and the United Kingdom (Figure 2). The marks for the top 5 exporters are close to each other and, when compared to importers, this could be a more dynamic scenario. Nevertheless, as the further data reveal, it is still a concentrated one. There is a top 5 competitors group that surpasses the mark of 500 000 (US Dollar thousand), while the rest of the analysed nations remains under that mark. The discussion will be about the more dynamic and relevant top 5 players.

The first and second spots for the malted beer exporters are shared by two major competitors, Mexico and the Netherlands. Homelands for the major breweries the Grupo Modelo and the Heineken, respectively, brewing is a traditional trade for these countries (Geppert et al. 2013). For Mexico, the data show an increase for the malted beer exports in 2005, which

made them catching up with the Netherlands in the same year. After that, the Mexican exports remained stable while the Dutch ones increased until 2009, when this country had a decrease in its exports while Mexico was still stable. A further Dutch decrease in 2010 along with a slight Mexican increase shifted the podium. Mexico remained the top malted beer exporter and the Dutch exports have been increasing since then.

Through most of the timeline, Germany remained stable as the third biggest malted beer world exporter. As Mexico and the Netherlands, brewing is a traditional trade for the Germans (Hornsey 2003). Important cultural aspects for beer in this country should not be ignored (Hornsey 2003). A decrease was registered only in 2009. The global financial crisis is related to trade deficits around the world. Regardless, the German exports were either stable or increased through the analysed period.

As Table 2 shows, among the top 4 exporters for malted beer, Belgium had the biggest annual average growth. Increases in exports were registered in the first four years of the analysed timeline for this country and for the United Kingdom. They were relatively on the same page until the British exports presented stability, while the Belgians continued to rise. Even a slight increase followed by stability was registered in 2009 and 2010 and after that, the nation resumed their rising to almost the same mark

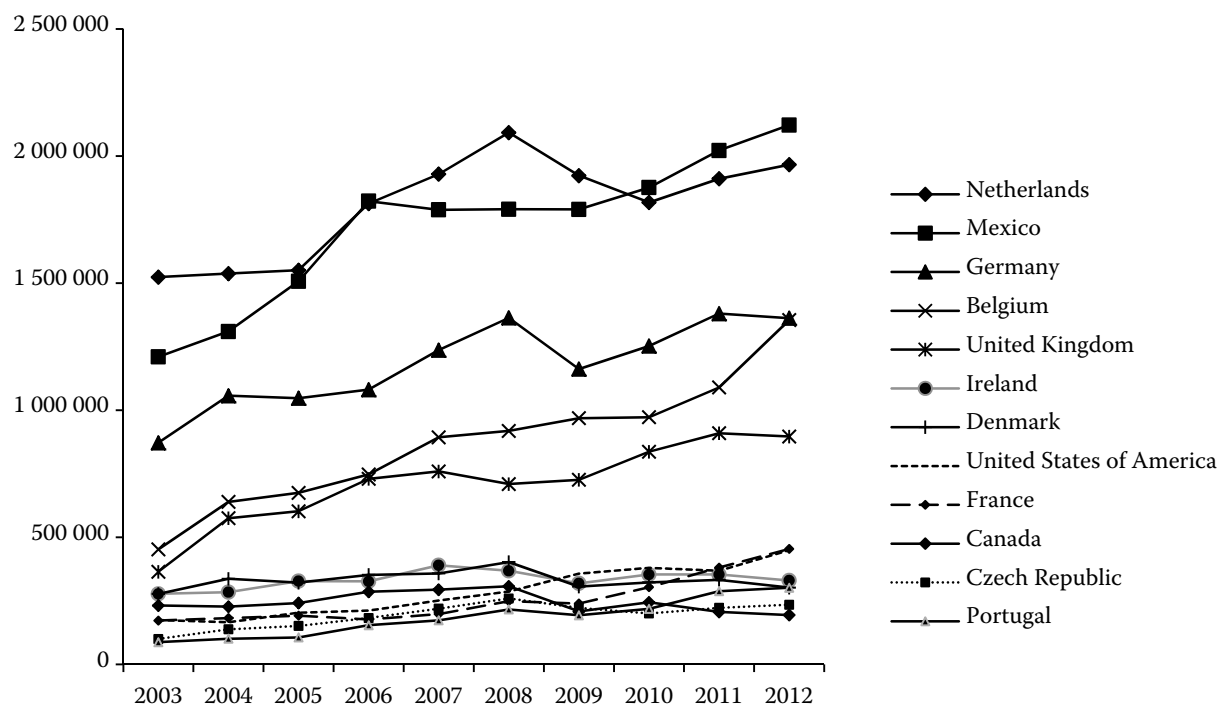


Figure 2. Top 12 exporters for malted beer (US\$), 2003–2012

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Table 2. Annual average growth for the Top 12 malted beer exporters (US\$).

	2003	2012	Difference	Annual average growth (%)
Netherlands	1 524 137	1 966 264	442 127	2.90
Mexico	1 210 094	2 121 906	911 812	7.53
Germany	872 279	1 362 491	490 212	5.61
Belgium	452 439	1 354 929	902 490	19.94
UK	364 684	896 736	532 052	14.58
Ireland	277 740	330 324	52 584	1.89
Denmark	277 484	302 297	24 813	0.89
USA	174 853	448 923	274 070	15.67
France	172 601	454 426	281 825	16.32
Canada	231 617	194 162	–37 455	–1.61
Czech Republic	100 180	234 873	134 693	13.44
Portugal	87 674	301 700	214 026	24.41

as Germany, the traditional number three exporter for malted beer. This is a significant change in the malted beer exports scenario, since Germany remained as the solid third biggest competitor through basically all analysed timeline. The data suggest that after the decrease registered in 2009, the German's exports remained stable, while the Belgians had a constant increase.

It is important to notice that major mergers took place after 2004, when the Belgian and Brazilian largest breweries (Interbrew and Ambev) formed the InBev (Swinnen 2011). Along with that, there was another significant merger in 2008 when the InBev and the Anheuser-Busch formed, finally, the AB InBev, the world's current greatest brewery (Swinnen 2011).

The United Kingdom is the fifth exporter for malted beer and as mentioned before, the nation's export timeline was similar to the Belgian one until 2006, when it began a four year period of stability. Nevertheless, while Belgium basically registered stability in 2009 and 2010, the UK registered increase and that lasted until 2011, when apparently a new period of stability was initiated.

Market share and concentration for imports

The imports of malted beer are highly concentrated, as Table 3 shows. The section below summons up three main importers for the product:

- the United States of America
- the United Kingdom
- Italy

as well as the countries which show a significant increase or stability in the terms of market share:

- Germany
- Canada
- France.

There is a high market concentration regarding the imports of malted beer, and the United States of America are the world's greatest importers of the product, as shown in Table 1. By 2003, their market share was up to 40 points, while the rest of the nations barely made 7.5 points (as seen by the UK and Italy). Data indicate 11.79 points of participation decrease for this nation in analysed period of time. However, it is a slow decrease. Transition between 2007 and 2008 had the higher value in this decrease, for 3.04 points.

The United Kingdom follows the United States of America, with the second biggest share of the analysed market. However, it is way behind the number one competitor. The data show the nation's initial share as 7.43 points and the final one as 5.44 points. This last one is the lowest mark for the nation in the ten year period analysed. There was an increase between 2003 and 2005, but by 2006 a slow decrease began. By 2011, there was a small increase, followed by yet another decrease in 2012.

From 2003 to 2004, the data reveal a small increase for the Italian share. But, after that, it remained relatively stable. A decrease of 1.19 points is registered from the beginning to the end of the analysed period. The nation's highest mark was 6.41 points, by 2004.

The nations above hold the highest market share for imports of malted beer. In general, however, there

Table 3. Market participation and the HHI for the imports of malted beer

	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
USA	43.30	40.52	40.55	41.80	38.37	35.53	34.59	34.94	32.24	31.51
France	5.09	5.62	5.58	5.00	5.23	5.13	5.39	5.38	5.39	5.66
UK	7.43	7.62	7.97	7.19	7.12	7.06	6.37	6.16	6.41	5.44
Italy	6.25	6.41	6.35	5.49	6.01	5.90	5.81	5.85	5.70	5.06
Canada	3.61	3.64	4.42	4.50	4.94	4.78	5.36	5.69	4.81	4.78
Germany	2.42	2.51	3.62	4.05	3.35	3.76	4.17	4.86	5.08	4.46
Belgium	1.71	1.61	1.38	1.50	1.50	1.27	1.38	1.53	1.76	2.96
Netherlands	1.97	3.03	2.47	2.29	2.42	2.18	2.23	1.92	2.43	2.52
Spain	2.66	2.74	2.37	2.28	2.47	2.44	2.22	2.13	1.94	2.06
Australia	0.73	0.89	0.84	0.89	1.13	1.42	1.69	1.68	1.67	2.05
Russia	0.90	0.91	1.04	1.35	1.54	1.78	1.63	1.57	1.62	1.81
Angola	1.82	1.34	0.85	1.17	1.15	1.39	1.27	1.38	1.57	1.62
Ireland	2.34	2.42	2.53	2.22	2.53	2.11	1.84	1.79	1.58	1.45
HHI	62.07	60.17	60.45	59.48	56.73	53.62	52.16	52.64	49.73	47.67

was a slow decrease in their numbers. The nations with a relevant increase will be treated below.

- Germany, with 2.04 points of increase, regarding the initial and final year of the analysed period. The highest mark for this nation was registered in 2011, up to 5 points. The years of increase between 2003 and 2006 were followed by two years of a slight decrease. The closing year indicates, again, a slight decrease.
- Canada registered in 2003 a 3.61 points mark followed by a seven year increase period with a slight stability by 2007 and 2008. 2009 was the nation's highest mark: 5.69 points of the market share.
- France remained relatively stable during the analysed timeline. The marks were between 5.09 and 5.66 points, the highest one.

Although a decrease of the HHI through 2003–2012 is evident, its final value by 2013 was 47.67, which still indicates a high market concentration, and the United States of America are the main importer of malted beer.

Market share and concentration for exports

As seen for imports, the exports for malted beer are also concentrated (Table 4). The section below summons up four main exporters for this product:

- Mexico
- the Netherlands
- Germany

as well as the countries that show a significant increase, decrease or stability in the terms of the market share:

- the United Kingdom
- Belgium
- Ireland
- Denmark
- France
- the USA.

There is a high market concentration for the exports of malted beer. Mexico and the Netherlands alternate through the analysed timeline between first and the second competitors for this market. The data show the initial Dutch share as number one with 22.42 points and Mexico slightly behind, marking 17.80 points. Both their numbers decreased in 2004, but the following years revealed a constant slow increase and it is notable by 2006 that Mexico, for the first time, surpasses its competitors and from this point forward, both countries are found in a particular situation where one alternates with the other as the number one competitor and the “owner” of the biggest market share. Since 2011, Mexico has it and its final mark is nearly 17 points, while the Netherlands' final mark is 15.69 points.

Although its position decreased (1.96 points) through the analysed period, Germany still remains a strong competitor. The data reveal a 12.83 points market share in 2003, a 13.74 points market share in 2004 and a slight oscillation follows by 2005 to 2008. The previously mentioned decrease takes place after this period.

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Table 4. Market participation and the HHI for the exports of malted beer

	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
Netherlands	22.42	19.99	18.88	19.44	18.70	18.7	18.32	16.50	15.92	15.69
Mexico	17.80	17.03	18.35	19.54	17.34	16.0	17.06	17.04	16.85	16.93
Germany	12.83	13.74	12.76	11.59	11.99	12.2	11.07	11.37	11.50	10.87
Belgium	6.66	8.31	8.22	8.01	8.66	8.24	9.23	8.83	9.08	10.81
UK	5.36	7.48	7.34	7.83	7.36	6.36	6.92	7.60	7.58	7.16
Ireland	4.09	3.69	3.99	3.51	3.78	3.30	3.04	3.21	2.95	2.64
Denmark	4.08	4.38	3.92	3.78	3.47	3.61	2.92	2.93	2.77	2.41
USA	2.57	2.15	2.48	2.27	2.43	2.57	3.41	3.45	3.07	3.58
France	2.54	2.37	2.34	1.90	1.92	2.23	2.28	2.76	3.17	3.63
Canada	3.41	2.96	2.94	3.07	2.85	2.76	1.99	2.22	1.72	1.55
Czech Republic	1.47	1.80	1.84	1.96	2.13	2.33	2.12	1.82	1.85	1.87
Portugal	1.29	1.31	1.29	1.65	1.68	1.94	1.84	1.98	2.40	2.41
HHI	59.70	59.07	58.21	58.60	56.69	55.3	55.68	53.75	53.34	54.31

The nations above hold the highest market share for the exports of malted beer and the competitors with a relevant increase or decrease will be treated below.

- The United Kingdom had a 1.8 points increase in the analysed timeline. Most notable is that this increase did not happen at a slow, constant pace. The transition from 2003 to 2004 confirms that. The nation had a 5.36 points market share in the first year, while already in the second one it had a 7.48 points market share. Relative stability followed. By 2008 and 2009, the nation had its first decrease, but by 2010 their pace had been restored. Closing mark is up to 7 points.
- The initial increase and long-time stability are key words for the Belgian market shares. The data reveal its lowest number in 2003 at 6.66. After that, stability follows and another increase (9.23) is registered in 2009, followed by slight decrease (8.83). Closing number for the country is 10.81, by 2012.
- Ireland and Denmark both had a general, constant decrease in their market shares. The Irish market share of the exports of malted beer initially was at 4.09 points, closing at 2.64. The Danish market share of the exports of malted beer initially was at 4.08 points, closing at 2.41.
- While Ireland and Denmark had similar losses, the United States of America and France had similar gains. The USA market share of the exports of malted beer initially was at 2.57 points, closing at 3.58. The French market share of the exports of malted beer initially was at 2.54, closing at 3.63.

Although the decrease (5.39 points) in the HHI for the exports of malted beer through 2003–2012 is lower when compared to the decrease (14.40) in the HHI for imports, the data reveal a more dynamic and competitive scenario for the first one. If for the imports the USA is undoubtedly the world's greatest importer while other nations are far behind them, for the exports we have alternatives regarding the question who holds the largest shares. Mexico and the Netherlands for the top 2, Germany and Belgium (by 2012) almost in the same situation regarding the third and fourth positions, while the increases and decreases of other countries are still important to perceive. It is, when compared to imports, a balanced scenario.

Relative position in the market

Table 5 registers the calculated RPM (LAFAY et al 1999) for the top 12 world exporters for malted beer.

Four main countries are appointed as the detainees of the significant RPM marks, which are above the mark of 3.0 points. The nations are listed below:

- The Netherlands: Through the analysed timeline, a 3.75 decrease in the Dutch RPM is revealed, even though the country had the second highest mark in 2012 (6.62 points). In the first year, they had their highest mark at 10.37 points. In 2004 and 2005, a decrease was registered, followed by a 1.10 points increase in 2006 (their second highest mark in the analysed time period). After that, another decrease followed by a relative stability for the next three

Table 5. Relative position in the market, 2003 to 2012

	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
Netherlands	10.37	8.71	8.19	9.29	8.18	8.32	8.14	7.41	6.83	6.62
Mexico	8.51	8.25	8.68	8.60	8.19	7.52	8.08	8.13	8.00	7.98
Germany	5.29	5.78	4.55	3.79	4.35	4.26	3.52	3.37	3.29	3.24
Belgium	2.52	3.45	3.41	3.27	3.60	3.50	3.98	3.72	3.71	3.96
UK	0.96	0.08	0.33	0.34	0.15	−0.33	0.34	0.81	0.65	0.88
Ireland	0.91	0.70	0.72	0.65	0.64	0.60	0.62	0.75	0.71	0.60
Denmark	1.95	2.03	1.72	1.68	1.56	1.58	1.28	1.29	1.25	1.07
USA	−20.10	−18.75	−19.08	−19.71	−17.89	−16.43	−15.41	−15.49	−14.42	−13.89
France	−1.23	−1.54	−1.63	−1.54	−1.64	−1.44	−1.52	−1.26	−1.06	−1.00
Canada	−0.06	−0.27	−0.74	−0.71	−1.03	−1.00	−1.65	−1.68	−1.51	−1.60
Czech Republic	0.69	0.86	0.85	0.92	0.99	1.07	0.92	0.74	0.79	0.83
Portugal	0.50	0.48	0.50	0.71	0.73	0.87	0.82	0.89	1.09	1.09

years. Again, in 2010 another decrease that went on 'till 2012.

- Mexico: When compared to the Netherlands, the Mexican RPM had a slight decrease and even so in 2012 the nation had the highest mark (7.98 points). In fact, through ten years there were only two significant (yet not major) decreases: in 2012 and 2008 (7.52 points). Stability seems to be a key word for the Mexican RCA, most of the time around 8 points (highest mark in 2005 at 8.68 points).
- Germany: The established third greatest exporter for malted beer registered a decrease (2.05 points) in its RPM marks, as well as the first two competitors. The highest German mark was registered in 2004 at 5.78 points, and the last year of the analysed timeline had the lowest mark (3.24 points). After 2004, a continual decrease was registered until 2007 (4.35 points), but after that, again a decrease followed.
- Belgium: Contrary to the previous nations, an increase (1.44 points) was registered for the Belgian RPM. After the initial mark in 2003 at 2.52 points, an increase followed by a three year stability. The highest marks for the nation were registered in 2008 and 2012 (3.98 and 3.96 points, respectively).

Through this paper we refer to Germany as the solid number 3 competitor in the terms of exports, as shown by Figure 2. However, when the RMS is taken into consideration, it is perceived that this status passes on in 2009 when the Belgian mark surpasses the German one. From then on, Belgium holds the third biggest calculated relative market share and

Germany has the fourth. The same is perceived in 2010 regarding Mexico and the Netherlands, when the Mexican mark surpasses the Dutch one.

Revealed Comparative Advantage

Table 6 registers the calculated RCA (Vollrath 1991) for the top 12 world exporters for malted beer.

- Mexico: Among the top 12 exporters, Mexico is the one with the highest marks for the revealed comparative advantage. Except in 2012, when its mark was registered at 5.11 points (registering a 2.95 points general decrease), the Mexican RCA remained constantly above the 8 points mark, 8.06 having been its lowest mark and 9.42 the highest, in 2003 and 2006, respectively.
- The Netherlands: The Dutch marks were relatively stable through the analysed timeline. It is notable, however, that in 2012 the country had a major decrease, marking 1.39 points, whereas in the year before their mark was at 5.40 points. The highest mark was registered in 2003 at 6.33 points.
- Ireland: Ireland was one of few countries that did not register any decrease in 2012. The Irish marks had a 0.85 points general increase and in the last year of the analysed time period, its third highest mark was registered at 4.13 points. The first one took place in 2008 (4.29 points) and 2009 (4.15 points).
- Denmark: The data reveal a general decrease in most nations' marks for the RCA in 2012. Along with Ireland, Denmark seemed to be the only country that registered a significant increase (2012 marked at 7.45 points). In general, the nation had a 2.73 points

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Table 6. Revealed Comparative Advantage, 2003 to 2012.

	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
Netherlands	6.33	5.72	5.61	5.84	5.42	5.49	5.23	5.04	5.40	1.39
Mexico	8.06	8.24	8.90	9.42	8.83	8.81	9.15	8.59	8.67	5.11
Germany	1.28	1.37	1.36	1.24	1.25	1.33	1.21	1.35	1.40	4.37
Belgium	1.95	2.47	2.56	2.61	2.78	2.79	3.07	3.23	3.42	2.69
UK	1.30	1.95	1.98	2.12	2.32	2.22	2.43	2.82	2.88	1.18
Ireland	3.28	3.22	3.77	3.88	4.29	4.15	3.20	4.09	4.18	4.13
Denmark	4.72	5.33	4.94	4.97	4.71	4.97	3.87	4.57	4.43	7.45
USA	0.27	0.24	0.28	0.26	0.29	0.32	0.40	0.41	0.37	4.02
France	0.53	0.52	0.56	0.48	0.49	0.60	0.61	0.81	0.98	0.42
Canada	0.93	0.85	0.85	0.95	0.94	0.97	0.78	0.86	0.69	0.66
Czech Republic	2.26	2.49	2.45	2.48	2.44	2.54	2.32	2.07	2.06	1.33
Portugal	3.03	2.69	3.52	4.59	4.52	5.54	5.23	6.13	7.33	2.16

increase in its marks. The lowest mark was registered in 2009 at 3.87 points.

- Portugal: In general, the Portuguese marks increased through the analysed timeline. In 2011, the country had a 7.33 points mark, the highest registered. As occurred with most nations, a significant decrease took place in the last year. Although dropping to 2.16 points (the lowest mark), the Portuguese RCA marks had a constant increase after 2006, registering minor decreases in 2007 and 2009 (4.52 and 5.23 points, respectively). We mention again that Portugal had the biggest annual average growth as seen in Table 2.

It is important to notice that while most countries presented a significant decrease in 2012, the German marks remained relatively stable through the years and, differently, in 2012 there was registered a significant increase: from 1.40 points in 2011, one year later the mark was at 4.37 points.

Along with Germany, the United States of America also registered a major increase from 2011 to 2012: from 0.37 points, the mark leaped to 4.02 points. The nation's marks were below 1 point through the analysed years and this leap should be noticed.

Net Export Index

The net export index allows a better understanding regarding the commercial character for the analysed nations. We recall that the NEI oscillates between -1 (meaning the nation would only import the product) and 1 (meaning the nation would only export the

product). In between those, when a nation reaches zero, it would both import and export the product. Table 7 details the net export index calculation for the top 12 exporters of malted beer.

From the Table 7, the top marks for the exporter characters are listed below:

- The Netherlands: The Dutch marks for the net export index reveals a strong tendency for exports. Oscillating between 0.74 (2004) points and 0.89 points (2010), the results are coherent with the previous data regarding the nation and its top position as one of the world's greatest exporters of the product.
- Mexico: Differently from the Netherlands' marks, the Mexican ones tended to decrease through the analysed timeline. A general decrease was registered at 0.17 points and the lowest mark through the years was registered in 2012 at 0.72. The highest marks were registered at 0.90 points in 2004, 2005 and 2006. Right after that, a decrease at 0.77 points followed by 2008 and in 2009 an increase (0.87 and 0.88 points respectively). From 2010 on, the marks registered a decrease.
- Denmark: In the terms of the NEI marks, Denmark is comparable to Mexico and the Netherlands. The lowest marks were registered at 0.76 points in 2009 and 2010 and the initial year of the analysed timeline had the highest one (0.89 points).
- The Czech Republic: Just as the Danish competitors, the Czech Republic marks are highly inclined to the export character. Except for 2002 with the 0.22 points mark, the rest of the analysed timeline shows an oscillation between 0.74 and 0.87 points. These marks appeared in 2009 and 2006, respectively.

Table 7. Net Export Index for the main exporters of malted beer

	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
Netherlands	0.84	0.74	0.76	0.79	0.88	0.79	0.78	0.89	0.88	0.88
Mexico	0.89	0.90	0.90	0.90	0.77	0.87	0.88	0.79	0.73	0.72
Germany	0.68	0.70	0.55	0.48	0.70	0.73	0.74	0.41	0.39	0.42
Belgium	0.59	0.68	0.71	0.68	0.56	0.53	0.74	0.71	0.68	0.57
UK	−0.15	−0.99	0.04	0.56	0.56	0.74	0.05	0.59	0.49	0.44
Ireland	0.28	0.87	0.22	0.22	0.69	0.71	0.25	0.66	0.09	0.89
Denmark	0.89	0.83	0.78	0.79	0.81	0.77	0.76	0.76	0.80	0.82
USA	−0.88	−0.72	−0.88	−0.89	−0.87	−0.86	−0.81	−0.81	−0.82	−0.79
France	−0.32	−0.46	−0.41	−0.44	−0.26	−0.26	−0.39	−0.31	−0.24	−0.21
Canada	−0.01	−0.99	−0.20	−0.18	−0.46	−0.39	−0.45	−0.42	−0.46	−0.50
Czech Republic	0.85	0.22	0.85	0.87	0.86	0.84	0.74	0.79	0.82	0.78
Portugal	0.61	0.55	0.62	0.74	0.76	0.80	0.79	0.11	0.72	0.14

- Portugal: The Portuguese marks were also highly inclined to the export character. The lowest ones were registered in 2004 (0.55 points), 2010 (0.11 points) and 2012 (0.14 points).
- Germany: Clear signs of decrease were also revealed for the German marks. The lowest marks were registered in 2006 and in 2010 to 2012. 2011 had the lowest mark at 0.39 points. The highest mark was registered in 2009 at 0.74 points.
- Belgium: A slight oscillating scenario was observed for the Belgian marks through ten years of the analysed period of time and the country's last registered mark was 0.57 points. When compared to 2003, a slight decrease of 0.02 points took place.
- Ireland: Opposed to the Belgian slight oscillations, the results show that Ireland has a higher oscillating scenario in terms of its net export index marks. In general, their marks were registered between 0.89 points being the highest in 2012 and 0.09 points being the lowest in the year before that. This kind of oscillation did not consist in a pattern through the entire analysed timeline.

The NEI calculations presented the nations above as the ones who had the exporter character through the analysed timeline. The import character and the import/export characters will be treated below:

- The United States of America: Coherent to what has been presented so far in this paper; the USA marks for the net export index were highly inclined to present an import character. The lowest mark (in the terms of distance to −1) was registered in

2004 at −0.72 points and the highest mark (in the terms of proximity to −1) was registered in 2006 at −0.89 points.

- The United Kingdom: The British numbers reveal an export and import/export tendency for the nation. The closest marks to 1 point were registered in 2008 at 0.74 points and 2010 at 0.59 points. The closest marks to 0 were registered in 2003 (−0.15 points), 2005 (0.04 points) and 2009 (0.05 points). In the rest of the period, the British marks were around 0.50 points.
- France: The French marks presented a slight oscillation scenario. Due to their relative proximity to 0 (when a country equally imports and exports the analysed product), it could be inferred that France had some inclination towards an import/export character since their numbers were not too close to 0 nor even reached −0.50. The highest mark in terms of imports was registered in 2004 at −0.46 points and the closest mark to 0 was registered in 2012 at −0.21 points.
- Canada: Apart from the 2004 −0.99 points mark, the Canadian numbers could be analysed in the same way as the French ones. The nation closed the analysed timeline with a −0.50 points mark.

CONCLUSIONS

The paper analyses the malted beer industry regarding its competitiveness and the international market structure. The United States of America

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are undoubtedly the world's greatest importer for malted beer. Marks for their competitors such as the United Kingdom and France (which along the USA form the top three importers) are far below the USA. The NEI calculation revealed a strong import character of this nation and the HHI for imports suggest that this is a highly concentrated market, even with the registered decrease of 14.4 points in its concentration. It could be inferred that the imports of malted beer consists of a concentrated market and the largest share of concentration lies in the hands of one main competitor.

In the terms of the calculated HHI, the data revealed that the export market for malted beer tends to be more concentrated than the import one. However, when comparing the number of competitors correlated to the largest market shares, the export scenario is apparently more dynamic. While for imports the USA detain the largest share, for exports we have four main players: Mexico, the Netherlands, Germany and Belgium.

While through most of the analysed timeline, the Netherlands and Germany occupied the first and third positions, respectively, and Mexico and Belgium occupied the second and fourth positions, for the last years, Mexico has become the number one exporter and Belgium the number three. In a nutshell: once the top four order was (i) the Netherlands, (ii) Mexico, (iii) Germany and (iv) Belgium. Now the data shows that the recent scenario consists in (i) Mexico, (ii) the Netherlands, (iii) Belgium and (iv) Germany.

The data show Portugal as a possible ascending exporter since the country's marks and the annual average growth in this trade tended to rise over the years. In closing, and as said before, the analysed timeline allows the researchers to infer that the malted beer industry consists in a concentrated market.

General changes in this panorama have occurred while the data revealed that the market structure for imports and exports had a decrease in its concentration. Nevertheless, the HHI marks both for the imports and exports closed around 50 points. The concentration decrease is more significant, though, for the exports, which reinforces the opinion that the export scenario could be more dynamic than the import one.

For future studies, there are suggested investigations concerning how the revealed comparative advantage based on exports was created and developed over the time in Mexico, Denmark and Ireland.

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