

Developments of the Brazilian Chicken Meat Industry in International Trade

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Abstract

Since 2004, Brazil has been the world's largest exporter of chicken meat. This study assessed the structure of the exporting chicken meat industry in Brazil, from 2000 to 2009. Industrial Organization was used, with emphasis on market concentration which was estimated with CR and HH indexes. Moreover, the trading partners were analyzed. Results reveal that market concentration was characterized as moderate. There was a decrease in concentration until 2007, which can be attributed in part to market enlargement. From 2007 on, one records an inversion on the decrease trend in concentration, which can be attributed in part to mergers and acquisitions; these processes, contributed for an industry restructure.

Key words: *Market structure, Poultry industry, Export.*

Introduction

Over the past ten years, the players of poultry industry have changed. The poultry sector was the most dynamic meat sector during the last decade, showing the greatest growth of all meat sectors as reflected in world consumption (FAO, 2010).

Windhorst (2006) considered that the centre of poultry meat production shifted from North and Central America to South and East Asia, and assumed that, in a few years, production volume in South America will surpass that of Europe.

Evolution of Brazilian chicken meat exports is outstanding. Since 2004, Brazil has become the world's largest exporter, participating with 38% of the global market (USDA, 2010). In the period 2000-2009, world's production of chicken meat grew 35,6%, while in Brazil the growth reached 84,3% (USDA, 2011). Around 30% of the total amount of chicken meat produced in Brazil was destined for international trade in 2009.

Regarding future perspectives for chicken industry in Brazil, projections of the agribusiness sector for 2019/2020 account chicken meat as the meat product with the major trend of production growth. Moreover it has potential to present the highest annual rate of exports growth (MAPA, 2010).

Therefore, how has the chicken meat industry in Brazil been structuring itself to reach an outstanding place as one of the most important world players?

Given these characteristics, this study aimed to analyze the structure of chicken meat exporting industry in Brazil, in the period 2000-2009, focusing on market concentration in a dynamic way, describing the characteristics of the country related to its exports and the demand for this type of meat in the world market.

Chicken meat demand

Meat consumption around the world

Addressing global demand for meat, the data of consumption for meats in different countries in 2008 is presented in Table 1.

Table 1 - Per capita consumption of meat, selected countries

Countries	Beef and Veal	Pork	Chicken	Total
				Kilograms Per Person ¹
United States	41,0	29,0	44,2	114,2
Australia	35,0	21,7	34,7	91,4
Brazil	38,8	12,8	39,7	91,3
Canada	31,1	25,5	30,0	86,6
EU – 27	17,0	42,8	17,3	77,1
Mexico	17,9	14,6	29,9	62,4
Russia	17,3	22,1	19,5	58,9
China	4,6	34,9	9,0	48,5
Japan	9,2	19,5	15,1	43,8

Source: USDA, 2010.

Notes: ¹Carcass Weight Equivalent.

Analyzing the selected countries, the highest *per capita* consumption of meat occurs in the United States, with 114.2 kg/year, which is also the country with the highest consumption of beef and chicken meat. For pork, the biggest consumer *per capita* is the European Union (EU), where the cattle and poultry consumption is lower than in other countries. In Brazil, the most consumed meat type is chicken, and the total amount consumed is similar to that of Canada and Australia.

Besides that, several countries have the potential to expand their meat consumption when compared to countries where this consumption is already high; China is an example, since its *per capita* consumption in 2008 represents approximately half of that in Brazil. Additional reasons for that are the aspects of the large population in China, the migration to urban areas and the increased income, which are considered factors that encourage increased consumption of animal protein. When one compares the consumption of chicken meat between countries, China's demand was 9 kg *per capita* in 2008, which refers to around 22% of the demand in Brazil, which can be understood as a market opportunity.

In addition to increasing urbanization, the increment of rural Chinese middle class is another factor that can boost the consumption of meat and encourage partners to export to China. It is interesting to note that the poor class dominated in the 1980s, the low class dominated in the 1990s and early twenty-first century, while the middle class became the dominant group in 2007, accounting for more than half of all rural households in China. (Yuan, et al. 2012).

China is the second largest producer of chicken meat. However, in contrast to Brazil, where an almost unlimited supply of the components used as inputs for poultry feed production – especially soybeans – is available, China might have problems in maintaining the high growth rates in the future, because of a shortage in feed supply. The consequences could either be slower growth rates or increasing imports of feed components for poultry production. Increasing imports of feed components would lead to a rise of the world market price for soybeans and corn, thus resulting in higher production costs worldwide (Windhorst, 2006).

Brazilian domestic market

Besides its outstanding performance as chicken meat exporter, Brazil also shows a relevant growth in the domestic market. One reason for this was the success of an economic plan named Real, with its so called “green anchor”. The green anchor refers to the contribution of food prices for controlling inflation rates, and chicken meat is considered one of the products which support the objective of price stability economic policy in Brazil (Farina and Nunes, 2002).

Implementation of “Plano Real” resulted, indeed, in a strong consumption of chicken meat in Brazil, mainly by classes with lower purchasing power, which transferred part of their food intake from carbohydrates to proteins (Silva, 2011). In 2010, chicken meat consumption in Brazil was 45.41 kg / capita / year, representing an increase of 94.89% over the year 1995, when consumption was 23.30 kg / capita / year (USDA, 2011). Thus, the increase in chicken meat consumption occurred in Brazil is also related to political changes.

Currently, Brazil stands out in a prominent position in chicken meat production, being world’s third largest producer. Its evolution is remarkable: production of chicken meat in this country rose from 5.98 million tons in 2000 to reach 11.023 million tons in 2009.

To achieve such production status, changes were required in the industry and an understanding on how it happened is important for assessments of the industry structure.

Data and Methods

Industrial Organization theory studies imperfect market structures, their competition patterns and their implications in both public policy and enterprise strategies (Scherer and Ross, 1990).

Structure describes the characteristics of the environment in which firms operate, being market concentration one of these characteristics. This is a synthetic index of the existent competition within a given market.

The most commonly used measures for quantifying concentration in a given industry are, according to Kon (1994), the Concentration Ratio (CR) and Herfindahl-Hirschman Index (HH). CR measures the proportion of industry ownership of the k largest firms, taking the chosen indicator as basis. This measure indicates the market share (concentration) of the k largest companies that make up the industry, the maximum figure being 100% (monopoly).

$$CR(k) = \sum_{i=1}^k S_i, \quad (1)$$

Where:

k = number of firms taken into account for calculation;

S_i = percentage share of the i company in the market.

Herfindahl-Hirschman Index (HH) is defined as the sum of the squares of percentage shares of each company in relation to industry total size. This index takes the maximum value of 10000 (if P_i is in%) when there is only one company in the industry (monopoly). The value of HH increases as the gap between the companies within the industry rises, thus presenting a good indicator of the market situation. Thus, the higher the index, the more concentrated the market and there are probably modifications in the competition pattern among companies.

$$HH = \sum_{i=1}^n S_i^2, \quad (2)$$

Where:

n = number of firms participating in the market;

S_i = percentage share of each company in the market.

Industry structure was assessed, based on market concentration, calculating concentration indexes CR4, CR8 and HH (variables of the industry structure) related to the total amount of chicken meat exported in net tons. Data was obtained from reports of the Brazilian Poultry Union (UBABEF, 2011).

Results

Diversification of exports

Factors of market behavior, such as production destination, might be interesting information to analyze geographical diversification of exports, regarding destinations of chicken meat. Different world regions might be understood as distinct markets, with diverse demands and supply possibilities (Jovanovic, 1993). Thus, the destinations of Brazilian chicken meat exports in 2000 and 2010, grouped by regions, are shown on Figure 1.

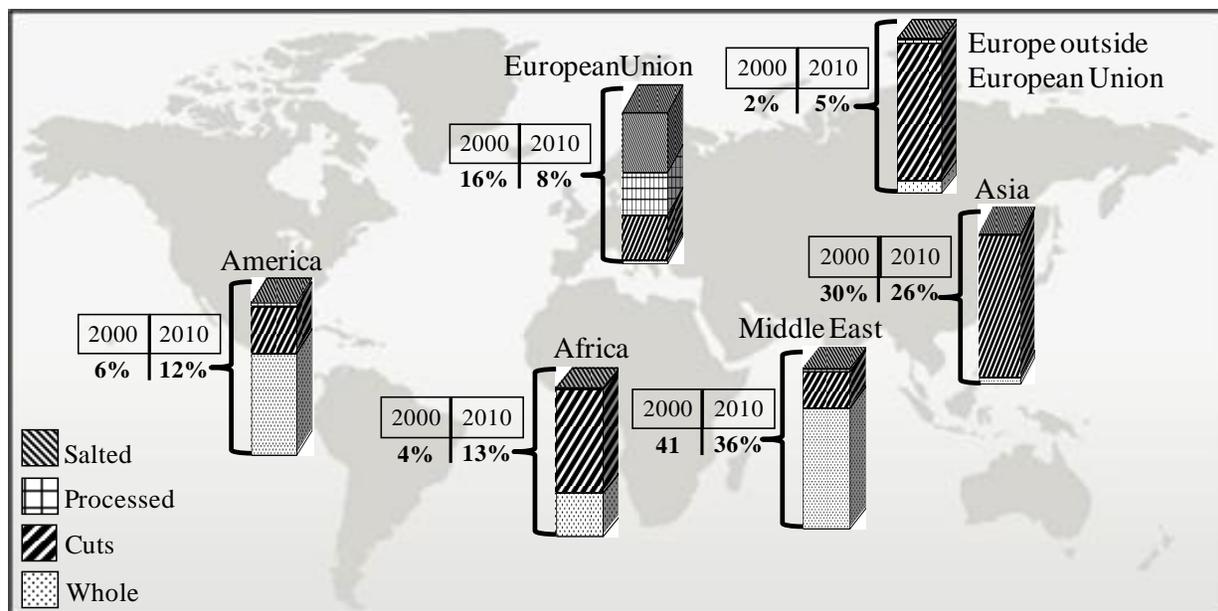


Figure 1. Brazilian chicken meat exports (%) in 2000 and 2010 and distribution of different chicken products by destination in 2010.

Notes: data from UBABEF (2011).

salted – chicken parts conserved with salt; processed – industrialized chicken parts; cuts – represent different chicken parts, such as thigh, breast and wing; whole – entire chicken.

Between 2000 and 2010, The Middle East stands out as importer of the greatest volumes exported by Brazil, followed by Asia, continent responsible for 26% of total amount in 2010. Analyzing both main destinations, one observes a difference on the type of products imported by these regions in 2010; while Asia concentrated its imports on chicken meat cuts (95,58% of total amount), the Middle East prioritized the purchase of whole chicken (75,98% of total amount). These two regions, which are the main destinations, in volume, reduced their participation on the total amount exported by Brazil. This also occurred with the European Union (EU), although its imports profile shows and orientation towards more elaborated products, such as cuts, industrialized and salted chicken meat.

The European Union is the main market of elaborated chicken meat types from Brazil, considering total exported amounts. This trading block imported more than 99% of the salted chicken meat and more than 80% of meat classified as industrialized traded by Brazil. However, these more elaborated types of meat (salted and industrialized) represent, respectively, 4,98% and 4,42% of Brazilian total exports amount in 2010.

African countries, America and Europe outside the European Union showed an increase of participation on the total amount exported by Brazil, from 2000 to 2010. In 2010, Africa concentrated 60% of its imports on cuts, differently from American countries, which orientated their purchases towards whole chicken – more than 60% of total. The prevailing type of chicken meat exported to Europe outside the European Union was cuts, representing more than 88% of total.

Changes on participation among regions corroborate with the evolution on the number of countries which import from Brazil, because there was an increase of diversification on both

aspects, which might be understood as a commercial advantage by avoiding the dependence on a few markets.

Thus, one notes the consolidation of chicken meat industry in Brazil, as well as its progress in the international market, which shows the ability of the firms to adapt to different demands.

However, it is important to direct efforts so that sanitary aspects or protectionism issues on international trade – such as non-tariff barriers – are monitored. Doing so, it might be avoided that such aspects harm the expansion of Brazilian chicken meat industry on diverse markets. For this to happen, industry and State are understood as important agents.

Dynamic analysis of market concentration

In Brazil, one of the world's leading exporters of chicken meat, there was an organization of the industry in order to meet global demand. Aiming to evaluate this industry, analytical indexes were calculated. Results of the concentration evolution in the export industry of chicken meat from Brazil can be observed in Figure 2, where the concentration ratio (CR) was calculated for different number of companies, related to the exports volume of chicken meat in net tons.

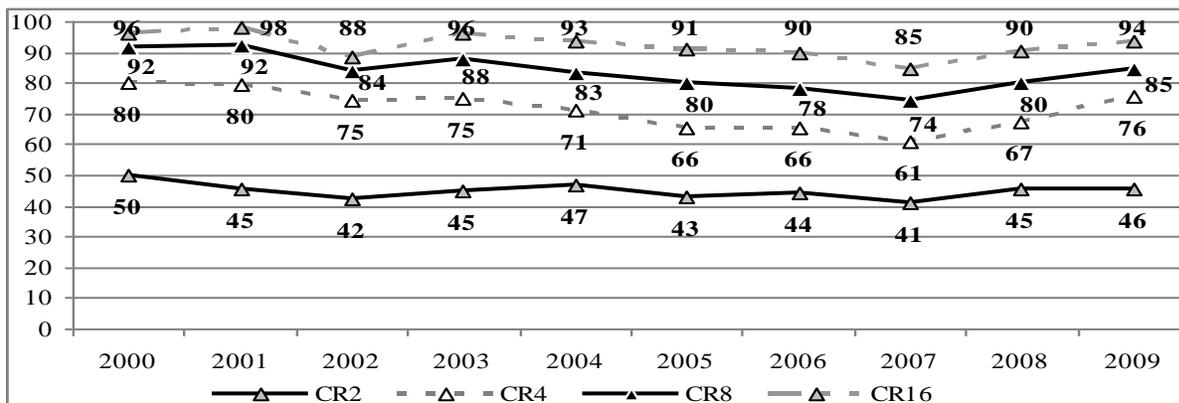


Figure 2. Concentration Ratio (CR)* of the chicken meat exporting companies in Brazil

Note: *% of the volume of chicken meat in net tons of two (CR2), four (CR4), eight (CR8) and sixteen (CR16) largest companies related to total volume exported in the sector; the higher its value, the more concentrated the market will be.

Analyzing the indexes, there was a general decrease in the concentration of exports in all CR (k) calculated between 2000 and 2009. In a detailed analysis one notes that there is a distinct behavior of reduction in the concentration, in which companies constituents (CR4) and (CR8) were the most affected with a decrease of -19% and -18%, respectively, in participation between 2000 and 2007. After 2007 there were changes of the downward trend with increasing concentration. Even with the oscillations, it is observed that the first 16 placements hold up to 92% on average of the exports during the period.

In order to complement the indexes analysis, all firms in the industry were considered in the calculation of the HH index, which results can be observed in Figure 3.

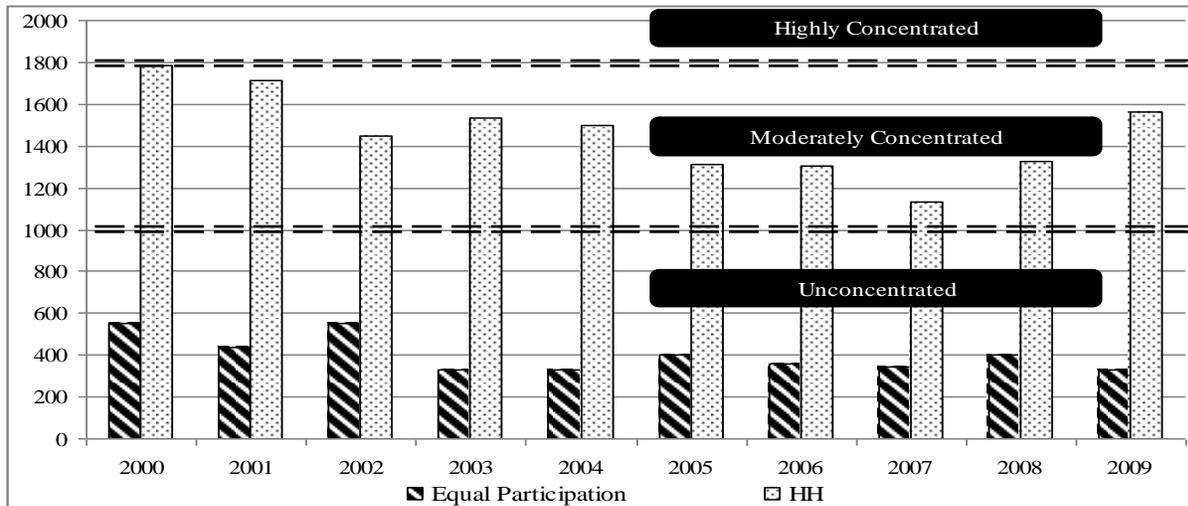


Figure 3. Concentration Herfindahl-Hirschman Index (HH)* of the chicken meat exporting sector

Note: *HH - measures the concentration of the market considering all the companies in the sector, the higher its value, the more concentrated the market will be.

When all companies were considered according to USDOJ (1997) criteria, market concentration presented the same trend of the $CR(k)$ calculation, falling down until 2007 and returning to increase after that. In 2000, there was the highest index and it is observed that the two largest companies hold a significant share of the chicken meat export market from Brazil, reaching, in that year, a CR_2 of 50% of the whole export amount.

Regarding the increasing trend in concentration observed after 2007, a reason for that might be related to mergers and acquisitions occurred among companies/firms of the chicken meat industry, mainly from the half of 2000s.

The HH index values are different when compared with an equal participation in the market, being placed in a range of moderate concentration.

After performing the calculation of HH and CR indexes, and verifying a decrease in concentration, it can be considered that values from the beginning of the period were already high. Another fact that also contributes for reducing the concentration is the increase of the markets with which Brazil has been trading, as shown in Figure 4.

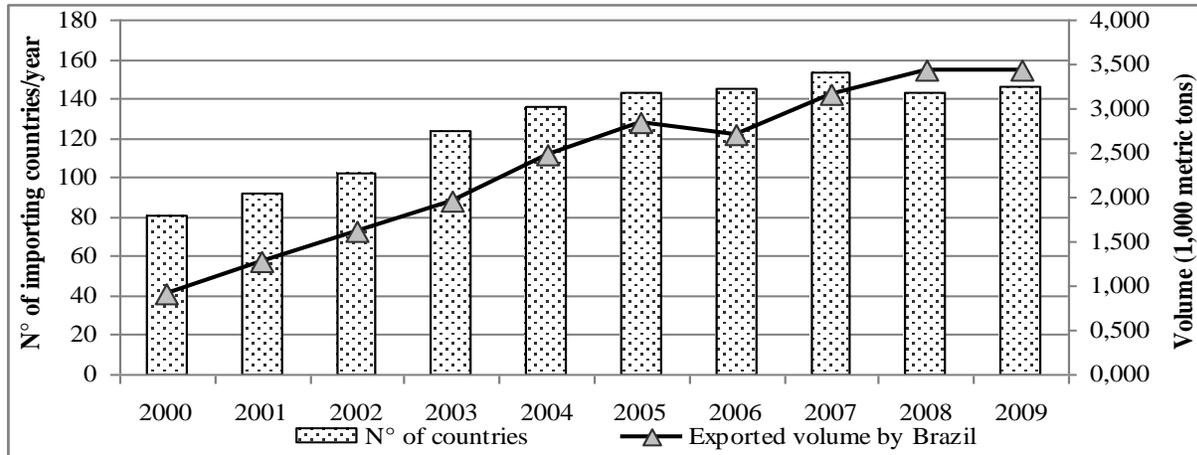


Figure 4. Number of importing countries and exported volume by Brazil between 2000-2009.

Note: data from ALICE WEB, 2011.

The positive evolution on exports is remarkable, not only in terms of number of countries which import chicken meat from Brazil, but also related to the exported amount. In 2000, the number of countries which imported chicken meat from Brazil was 81; in 2009, it was 146. This growth was continuous and represents the ability of Brazilian industry in accessing new markets. Moreover, an increase of 275% in the exported volume was reached by Brazil between 2000 and 2009, while world's increase was 74%.

Conclusions

This study sought to describe the structure of chicken meat industry in Brazil with focus on the exports. It revealed the competitiveness of chicken meat industry in Brazil due to remarkable developments achieved in the international market.

It was also observed that Brazil has significant meat consumption and that chicken is the most consumed meat type. Thus, chicken meat industry acts towards not only the domestic but also the international market, with significant participation in both of them.

Given the analysis of destinations and types of markets served by Brazilian industry, one observes that they are broad and diverse, showing the versatility of the industry as well as its need to meet the requirements to reach new markets and to increase the proportion of industrialized meats on total exports. In 2009, the types of industrialized and salted chicken meat together accounted for 10% of total amount exported, and they generally have greater price in the international market due to the adding value generated by processing.

Regarding market concentration, there was a decrease in the levels of industry concentration, based on both indexes used - Concentration Ratio (CR) and Herfindahl-Hirschman index (HH) - by the year 2007, which can be attributed, in part, to the access of new markets and to the increase of exports. However, in 2008 and 2009, there was an increase in the levels of concentration, which can be ascribed, partially, to the occurrence of mergers and acquisitions in the Brazilian poultry sector in this period. Considering all companies, the chicken meat industry is placed on the range of moderate concentration during the given period.

Future researches on the chicken meat industry should address environmental aspects, as well as other agents in the production chain. Besides that, the phenomenon of mergers and acquisitions in the poultry industry can be discussed and assessed.

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