REA | ITALIAN REVIEW OF AGRICULTURAL ECONOMICS

Firenze University Press
www.fupress.com/rea

Citation: C. Cabral da Costa, H. Lee Burnquist, J.J.M. Guilhoto (2019) Special agricultural safeguards in the meat market and their impact on Brazilian economy. *Italian Review of Agricultural Economics* 74(1): 73-83. doi: 10.13128/REA-25480

Data Availability Statement: All relevant data are within the paper and its Supporting Information files.

Competing Interests: The Author(s) declare(s) no conflict of interest.

Special agricultural safeguards in the meat market and their impact on Brazilian economy

Cinthia Cabral da Costa[1], Heloisa Lee Burnquist[2], Joaquim José Martins Guilhoto[3]

[1] *Brazilian Agency of Agricultural Research (EMBRAPA), São Carlos, SP, Brazil*
[2] *University of Sao Paulo, Piracicaba, SP, Brazil*
[3] *Organisation for Economic Co-operation and Development (OECD), Paris, France*

Abstract. This study identifies the impact of special agricultural safeguards (SSG) for the global meat market and for the Brazilian economy. The tariff lines subject to SSG were selected and the period of analysis was from 1995 to 2015. The value of additional tariff was calculated for each of the most important tariff lines, as well as, their impact on imports and Brazilian exports. The most important markets that applied SSGs were the U.S. for beef and European Union for poultry. For the additional tariffs that were estimated, the results indicated that the impact of the value of the meat not exported by Brazil to EU and the U.S. due to SSG tariff was equivalent to the loss of BRL 3.7 billion of the economy's production value and almost BRL 2 billion of the Brazilian Gross Domestic Product.

Keywords: Beef, poultry meat, SSG tariff, input-output matrix, Brazil.
JEL codes: F13, C67.

1. INTRODUCTION

The Uruguay Round Agreement on Agriculture (URAA), concluded in 1995, is an important benchmark in international trade. One of the most significant results of the URAA was eliminating quantitative barriers, the so-called import "quotas", which were the most protectionist mechanisms used by developed countries against agricultural imports. In its place emerged the tariff quotas[1] (defined by the TRQ acronym, from the English name "tariff rate quota"). However, very high extra-quota tariffs may also be prohibitive for trade and, hence, work in the same manner of the quantitative quotas that existed before 1995. In addition, another mechanism was implemented along with the tariff quotas, which did not previously exist and was intended to be transient, the so-called special safeguards, known by the SSG acronym (from the English name "special safeguards").

[1] In this mechanism the same product has two different tariffs: one that is lower, applicable up to a certain level of imports (in-quota) and another higher tariff, applicable when the imported volume exceeds the quota limit (extra-quota)

The SSG consists in an additional tariff applied to the extra-quota tariff. However, unlike the extra-quota tariff, the additional SSG tariff is not a fixed value or percentage, but depends on certain conditions. There are two conditions in which it may occur: (i) when the import price is lower than a certain value (price trigger) or (ii) when the import volume is larger than a certain quantity (volume trigger).

During the Doha Development round between 2002-2006, the SSG mechanism did not receive any formal proposal for elimination or change. On the contrary, instead of eliminating or reforming this mechanism, what was proposed in that occasion and resumed in the discussions in the WTO Ministerial Meeting in Nairobi, in 2015, was a similar mechanism, which would be adopted by the developing countries, called SSM (acronym for the English name "Special Safeguard Mechanisms"). Some studies about the SSG action carried out in a way to subsidize analysis for building the SSM are: Pal & Wadhwa, (2006); Aznal, (2007); Harris, (2008); Finger, (2009); Wolf, (2009) and Hertel *et al.* (2010).

Among the studies developed with this purpose, only Harris (2008) made an in-depth analysis of the SSG. This author showed that the SSG, which should have been applied only during the implementation period of the Uruguay Round reforms, continued in use as a permanent mechanism. By analyzing the notifications of SSG in the period from 1995 to 2002 or 2007, depending on the existence of the notifications, this author verified that the most affected products were meat, dairy and sugar. The countries with highest use of such instrument for these products were the European Union (EU) and the United States (US), and they used the price-based mechanism (price SSG). Japan also presents a high application of the latter, but to a larger set of products and making use mainly of volume-based SSG. Harris (2008) also includes in his study some criticism to the values indicated for the triggers, in particular related to the reference price. These triggers were fixed by the average values observed in the period 1986-88 and never updated. At that period, the level of agriculture prices was relatively high. He adds that it would be of no use to cut the extra quota tariffs if this mechanism was not reviewed, since the additional SSG tariff could become more prominent and restrict trade in the same fashion.

The main difference that distinguishes the special agriculture safeguards (SSG and the SSM proposal) of the general safeguards is the fact that the former is automatic, while imposing the latter depends on proof of the damage. As they are automatic and, therefore, exempt from any damage-proving criterion, the agriculture safeguards may be applied without any justification.

A specific analysis of the SSG impact was carried out by Costa *et al.* (2015). These authors estimated that the impact of their use in the period from 1995 to 2013 over sugar exports in the US and EU was equivalent to a reduction in Brazilian sugar exports of 8 million tons of sugar (approximately 7 million not imported by the EU and 1 million by the U.S.) The authors also estimated that, if these exports had occurred, Brazil could have gained, in that period, approximately BRL 42 billion in production value for the entire economy, considering the direct, indirect and income effect impacts. As alerted by Harris (2008), the price triggers for sugar (average values observed in the period 1986-88) presented very high price levels, causing a practically constant application of the mechanism.

This study has the objective of a similar analysis to that made by Costa *et al.* (2015) but adjusted to another important group of agriculture products: meats. The next section (section 2) shows the behavior of international meat trade and the importance of Brazil in this market. Section 3 describes the methods and data used with the objective of identifying the impact of the additional SSG tariff and, in section 4, the empirical estimates of its usage impacts in the meat markets were analyzed. Finally, section 5 concludes the analyses and results presented.

2. THE INTERNATIONAL TRADE OF MEAT

According to OECD-FAO data (2015) on all global meat consumption, the share of beef, pork and poultry represents 22%, 38% and 35%, respectively. In that same report, there is a growth prediction of 12% in the consumption of beef and pork and 24% in poultry consumption. Regarding trade, according to FAO data (2018b), the global meat import value registered in recent years (2010-2013), represents 5% of the global agriculture imports. Of this total, 40% is beef, 32% poultry, and 26% pork. This section has the objective of identifying the top players in this market, in a way to stress the significance of this study's topic for the Brazilian economy, as well as identifying the importance of the countries that use special safeguard for meat products.

Figure 1 shows the major frozen beef exporters and importers for the most recent years. Figures 2 and 3 show this same profile, but for poultry and pork, respectively. As may be observed in these figures, Brazil stands out as the largest global exporter of beef and poultry, and one of the top in pork. It is verified in Figure 1(b) that the U.S., China[2], Russia, Japan and EU are the top

[2] The data from China correspond to the sum of the values of Hong Kong, Continental China, Macao and Taiwan.

beef importers. Due to geographic proximity, the North-American market should be the most important for Brazil. However, according to USITC (2018), in the entire period analyzed, the United States imported 49% of beef from Australia and 36% from New Zealand and no imports originating from Brazil. That distortion occurs due to the tariff rate quotas (TRQ) applied by the U.S. on the beef imports, as described in Table 1. Thus, this further stresses the importance of protectionist barriers applied in that market and the potential damage for Brazilian exports.

In the poultry market, Brazil also stands out as a global exporter (Fig. 2a). The top importers, described in Figure 2b are: Japan, China, Saudi Arabia and the EU. As for the pork market, the European Union (EU), the U.S. and Canada detain a higher share than Brazil in global export value (Fig. 3a). Among the top importers are Japan, China, Russia and the U.S. (Fig. 3b). This picture of these meats' global trades, which are the most commercialized and consumed in the world, demonstrates not only the importance of Brazilian exports but also the importance of importing countries that adopt trade barriers. Table 1 describes the products and the top importing markets, indicating which of them used tariff quotas (TRQ) and applied additional tariffs from the special safeguards mechanism (SSG) on their imports during the period of 1995, when these mechanisms were introduced, up to the latest notifications, which refer to 2015. Table 1 shows that most of the relevant importers do apply tariff quotas and have a right to apply an additional tariff due to the SSG.

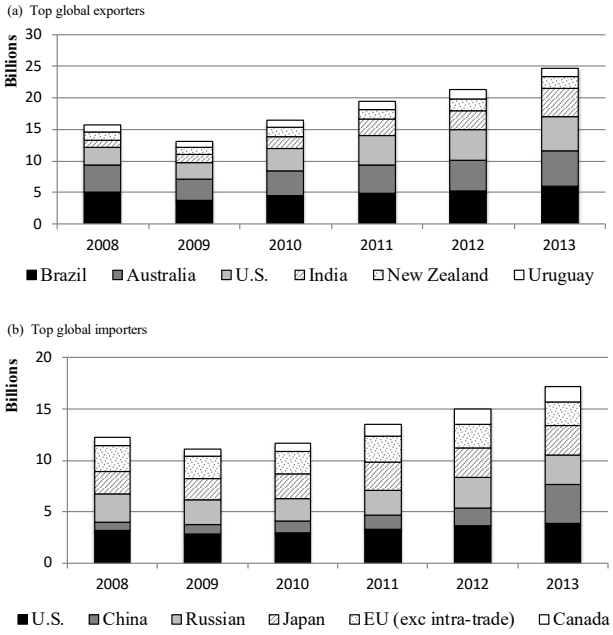
China, another market that has been prominent in the imports of some of these products, especially pork and poultry, does not apply TRQ or SSG for these products. However, China Taipei has a TRQ and right of use of SSG for these products. Despite the meat TRQ in this country being as a simple tariff, since the intra and extra quota tariffs are the same, there have been notifications of SSG use in these products for several years. As it is not possible to distinguish the imports of China from

Tab. 1. Use of tariff quota mechanisms (TRQ) and special safeguards (SSG) in the main meat and dairy importing markets, in the period from 1995 to 2015.

	European Union	United States	Japan	Canada	Russia
Beef	TRQ	TRQ / SSG	-	TRQ	TRQ
Poultry	TRQ / SSG	-	-	TRQ	TRQ
Pork	TRQ	-	-	-	TRQ

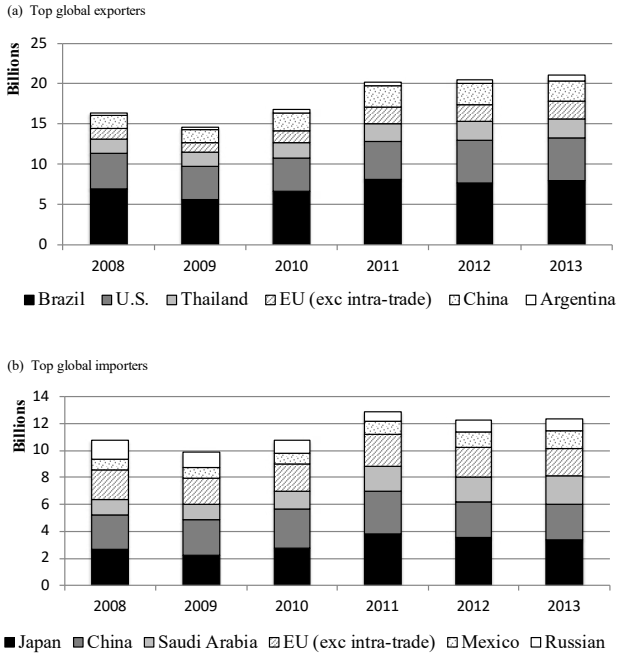
Source: WTO (2018a e b).

Fig. 1. Values, in USD, exported by the top global exporters and importers of frozen beef in the period between 2011 and 2013.



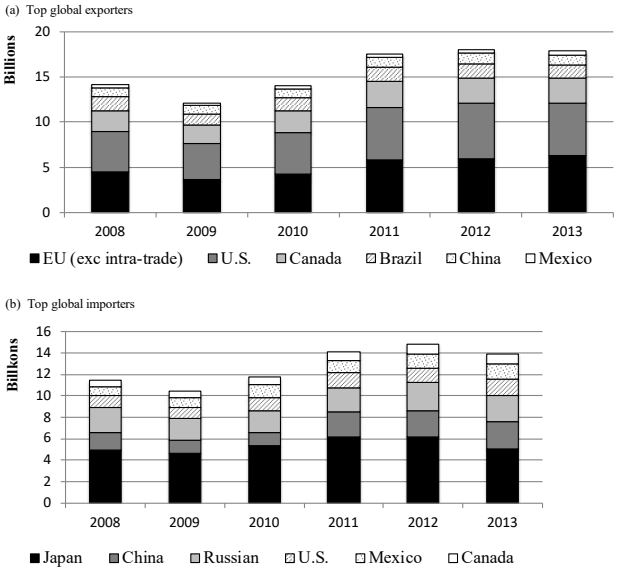
Source: Prepared by the authors, based on FAO (2018b).

Fig. 2. Values of poultry trade by the top global exporters and importers, in USD, for the period between 2011 and 2013.



Source: Prepared by the authors, based on FAO (2018b).

Fig. 3. Values of frozen pork trade by the top global exporters and importers, in USD, for the period between 2011 and 2013.



Source: Prepared by the authors, based on FAO (2018b).

those of China Taipei, according to the data available in United States (2018), it is worth noting that in this market as well there are high levels of protectionist barriers from these mechanisms that could have been put into practice.

The SSG is still a protectionist mechanism that lacks analyses in terms of its impact. Given the relevance of the meat market for Brazil and the use of this protection mechanism in markets of major relevance in their imports, this study sought to evaluate the impact of additional SSG tariff use in the main meat importing markets. The entire period during which this mechanism has been in place was analyzed, since 1996 until the latest notifications registered with the World Trade Organization (WTO), in 2015. The analyses carried out in this study, therefore, focused on the countries and products described in Table 1 that applied the additional tariff from the SSG and estimated their impacts, by means of the export level that would have been achieved if they had not been applied. The following section describes the methods and data used in this analysis.

3. METHOD AND DATA

This section presents the theory and method used to estimate the impact of the additional SSG mechanism applied on trade. Considering that the application of the additional SSG tariff should be obligatorily notified in a document with the WTO, the first stage consisted in identifying their application in this database (WTO, 2018a). The notifications indicate the tariff line affected and the year for each country. In parallel, the main tariff lines (TL) used on meat imports in the markets analyzed were identified for United States and European Union in the period 1995-2015. These data were obtained from Eurostat (2018) and USITC (2018). The SSG notification does not present the additional tariff value. Therefore, at second stage of the study an estimate of the additional tariff value is obtained.

The additional tariff depends on the nature of the SSG applied, i.e. if it was on volume or price. In the case of meat exports, the price-based SSG was the most important. As previously described, for the volume-based SSG, the additional tariff could be any value up to 33% of the tariff applied. For the price-based SSG there is a rule that was used to obtain estimates in this study. The rule is that if the import price falls below a certain limit, defined as a price trigger, in a value less than or equal to 10% of that trigger, no additional tariff is imposed; if the difference is within 10% and 40% of the trigger price, the additional tariff is 30% of the amount at which the difference has exceeded the 10% of the trigger price; if the difference is within 40% and 60% of the trigger price, the previous account is summed with an additional tariff of 50% of the amount at which the difference exceeds the 40% of the trigger price; if the difference is within 60% and 75% of the trigger price, the additional tariff is 70% of the amount at which the difference exceeds the 60% of the trigger price, summed to the increments described in previous intervals. Finally, if the mentioned difference is beyond 75% of the trigger price, the additional tax will be 90% of the amount at which the difference has exceeded the 75% of the trigger price, plus the integral increments corresponding to the previous intervals (FAO, 2002).

Therefore, it is verified that for these calculations, the import prices should also be identified. An average import unit value of the country in the year of application was used as a proxy, obtained by dividing the value and volume of imports of each tariff line, using data obtained from the sources: Eurostat (2018) and USITC (2018). Nonetheless, when there is a notification of SSG use and the identified price is not below 10% of the trigger price, we adopted a reference price from other major global importers, obtained from United States (2018).

Once the values of the additional tariffs were estimated for each year in which their use was notified, we use an economic formula to estimate the trade gains deriving from the price change. This formula is described in equation (1).

$$\Delta M = \eta^M * \Delta P * M_{BASE} \quad (1)$$

where M is the imported volume; P is the price paid by domestic consumers; η^M is the import price elasticity; and Δ represents a percentage variation. Thus, $\Delta P = \left(P_f - P_i\right) / P_i$. M_{BASE} is the quantum imported, considering the initial price P_i), i.e. the price paid by the consumer before a change in the import tariff, which directly impacts that price.

Considering that the variation is caused by the change in the country's import tariff, equation (1) can be rewritten as described in equation (2). Since it is necessary to use all tariffs imposed on the product, extra-quota tariffs were also considered in addition to the additional tariff. Thus, T_i is the initial import tariff, which represents the extra-quota tariff plus the additional SSG tariff and T_f is the extra-quota tariff without the additional SSG.

$$\Delta M = \eta^M * \frac{\left(T_f - T_i\right)}{\left(1 + T_i\right)} * M_{BASE} \quad (2)$$

The import tariff is given in percentage terms of the price of the imported product. In the case that the tariff is specific or mixed, the tariff equivalent was annually estimated, considering the same import price used to estimate the SSG for each year, or the country's annual average import price.

The value of the import price elasticity η^M), in turn, depends on the product's domestic demand η^d) and supply η^s) elasticities, as well as the ratio of the volume consumed (D) and produced (S) with the imported quantum (M). Equation (3) describes the formula to obtain the import demand price elasticity[3].

$$\eta^M = \eta^d * \frac{D}{M} - \eta^s * \frac{S}{M} \quad (3)$$

The elasticity data was obtained from Fapri (2018) and the domestic consumption and production data from FAO (2018).

By knowing the volume that was not imported due to the application of the SSG in each year, a part of this volume was adopted as potentially being supplied by Brazil. The percentage used to calculate the exports that Brazil ended up not sending to that country was based on the percentage that Brazilian exports X_{BR}) of that product group had within global exports X_W), in each year of the analysis. By multiplying the volume that the country ended up not exporting by the basic price (received by the producer - P_b) we obtain for each year an estimate of the value of the country's exports losses (y). Equation (4) describes this calculation. It can also be verified in this equation that, despite the variations in imports and Brazil's participation have been estimated year by year, the value that was not exported was calculated for the entire period analyzed (the subscribed "t" indicates the year analyzed). This was done so this value could be placed as a total impact to estimate other effects on the Brazilian economy, which is described below.

$$\sum_{t=1996}^{2015} \left[\Delta M * \left(\frac{X_{BR}}{X_W} \right) \right]_t * P_b = y \quad (4)$$

The value of y was then used as a demand shock (demand that did not occur) on the input-output matrix of the country. This relationship between demand shock and the impact on the economy can be obtained from equation (5), as described by Miller & Blair (2009). In this equation, the variable Y represents a demand matrix, where the value of exports that did not occur is entered[4]; X is the matrix that describes the impact of that demand on the production value of the entire economy and matrix (A) represents the technical relation in the intermediary demand.

$$X = (I - A)^{-1} Y \quad (5)$$

The impacts (X) estimated in this manner indicate the direct and indirect effects on the economy, also called type I multipliers. Type II multipliers were also obtained as type I plus the effect of a consumer income variation caused by the direct and indirect effects. In order to obtain type II multipliers, the matrix A of technical coefficients includes "families" as if it was another sector of the economy. The new matrix is described $\overline{A}$.

In addition to the impacts on the production value, the impacts on the value of remunerations (Z_R), of imports (Z_M), of the number of jobs (Z_E) and of the Gross Domestic Product (Z_{GDP}) were also estimated. For such, the result obtained from equation (5) was used to obtain the estimates described in equation (6).

$$Z_{(nx1),k} = [\text{diagonalized}(C_{(nx1),k})]_{(nxn),k} * X_{nx1} \quad (6)$$

[3] The derivative of this equation can be found in Orcutt (1950).

[4] The difference between y and Y is a value and Y is a vector-type matrix where, in the line corresponding to the meats sector that was not exported by the country, the value y found is included.

Where $k = R$ (remunerations value), M (imports value), GDP (GDP value) and E (number of people employed). The C_k coefficients were obtained at the actual input-output matrix.

The input-output matrix used in this study was estimated based on the data from the Brazilian National Accounts (Brazil, 2018) as described by Guilhoto and Sesso (2010) and Guilhoto and Sesso (2005). The productive structure, in terms of the value and the coefficients used, which were the structures required to obtain the results, refer to that observed in the country in 2013.

4. RESULTS

As described in section 2, the analysis made in this study focused on the countries and products described in Table 2, which made use of the SSG in the meat market. They are: the U.S. in the imports of beef and EU in imports of poultry. The additional SSG tariff is applied over the extra-quota tariff value. The extra-quota tariff applied in the U.S. on beef is 26.4%[5]. In the case of EU, there are mixed tariffs. In order to estimate an equivalent ad valorem value (EAV) of the mixed tariffs, it should be taken into account that their EAV changes depending on the import price reference. Figure 4 shows the EAVs calculated for the poultry extra-quota tariff in the EU for each year, using the average import price of each one of them. It may be observed in Figure 4 how the tariff equivalents change their protection level while changing the product price reference. In that sense, it is verified that a higher level of tariff protection is observed for lower price levels, which means increasing the protection in periods of global excess supply, which in turn also contributes to the even higher increase in this excess, causing a snowball-type effect. The same rationale applies to the impact of special price safeguards, whose additional tariff increases as the product import price decreases.

In order to make a comparison between the products' protection level, we therefore consider that in the EU, depending on the import price used, the EAV remained between: 50-70% for poultry; 70-90% for beef; and 25-30% for pork.

Despite indicating only one tariff for an entire product group, we actually have several tariff lines (TL), often with different tariffs, for each type of meat. The tariff described and used in this study in each group represents the most relevant TL in the country's imports. Likewise, for each of those products, in each country, we have some TLs where the SSG was applied. For the products analyzed, it was observed that the price SSGs were the most active and that there were nine tariff lines that stood out when observing their application: one TL in the U.S. (tariff line 02023010 and 02023080 – beef, frozen, intra and extra quota, respectively) and eight poultry TLs in the EU (they are: 02071290 – whole frozen chicken; 02071410 – boneless chicken, frozen; 02071450 – chicken breast, with bones, frozen; 02071460 – chicken legs, with bones, frozen; 02071470 – other chicken parts, with bones, frozen; 02072510 – whole turkey, frozen; 02072710 – turkey cuts, frozen and; 02073615 – duck or goose meat, frozen)[6]. This was the universe analyzed in this study[7].

Figure 4 shows the estimated values of the additional price-based SSG tariffs for this set of nine TLs that used this mechanism, along with the extra quota tariff applied at each year, for the period from 1996 to 2015. Since the price SSG is applied per ship and there is no way to identify the cargo's import price on which it was applied, the analyses were performed with average annual prices. The average extra quota import price was used (only the U.S. indicate the intra and extra quota imports separately), for it is on the extra quota imports that the SSG incurs. However, in the cases where the country declared use of SSG and the import price identified was not below the trigger price, a global import price was used for this estimate, as described in Section 3. For some TLs, however, it was observed that even using this resource for several years, despite the country having notified the use of price SSG, import price levels low enough to warrant an SSG activation were not found. All years where there was a notification of SSG activation and the price observed did not corroborate with their use were marked in Figure 4 charts with a square. A larger price variation can occur during some years and justify the use of an SSG, since this study used an annual average price. But if that was the case, as during most of the period analyzed, the use of a safeguard instrument wouldn't be expected.

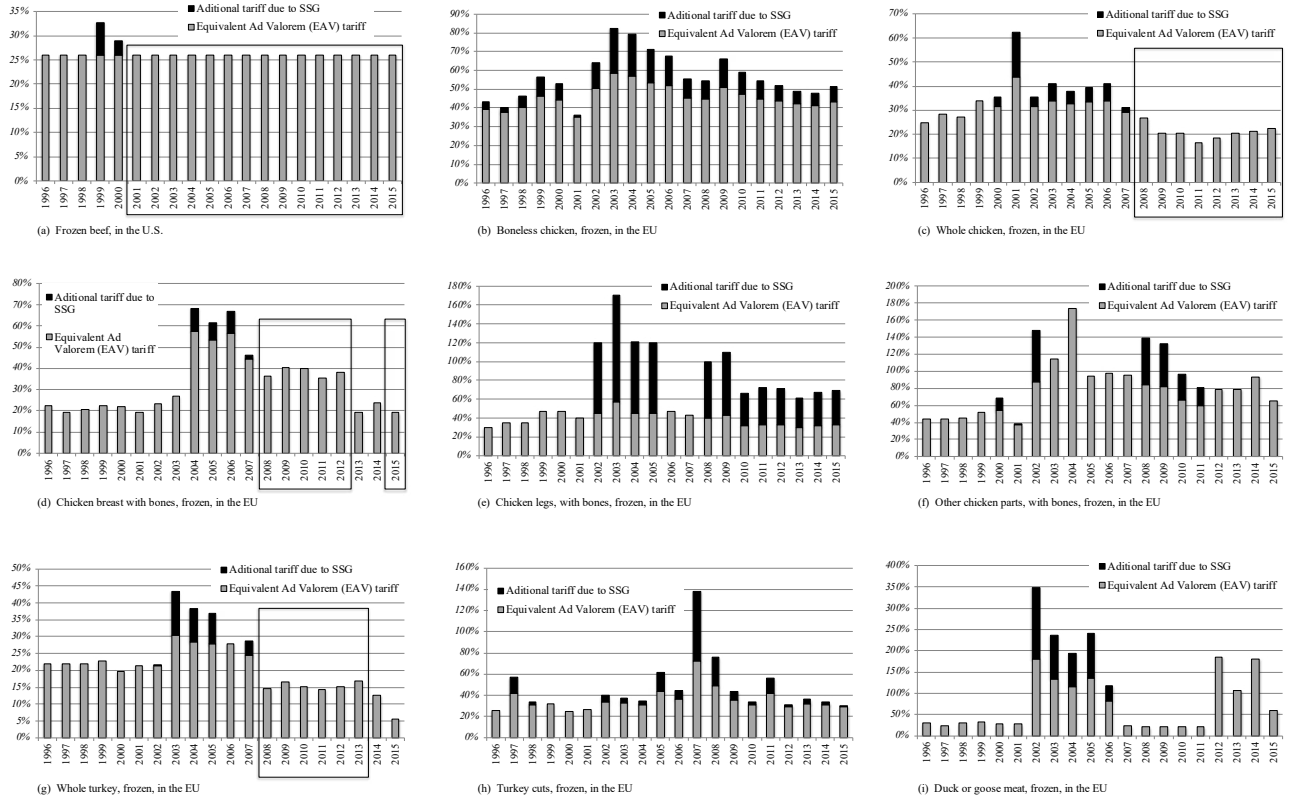
In those cases, since the import price is above the trigger price, as well as the global prices, it was not possible to estimate the corresponding additional tariffs. It

[5] The extra-quota tariff applied in the U.S. on beef imported by Australia is lower (21.1%) than the others.

[6] In the period analyzed (1995-2015) these tariff lines underwent some transformations. Therefore: the TL 02071210 was 02072110; the TL 02071290 was 02072190; the TL 02071410 was 02074110; the TL 02071450 was 02074151; the TL 02071460 was 02074171; the TL 02071470 was 02074171; the tariff line 02072510 was 02072210; the TL 02072710 was 02073931 and; the TL 02073615 was 02074515 and also 02074315.

[7] Japan, despite not having a tariff quota for pork meat, submitted a volume SSG usage notification for this product in 1997. This data was not estimated and stands as a mere observation in this study.

Fig. 4. Equivalent Ad Valorem tariff (EAV) estimated for the extra quota and additional tariff estimate from the use of price SSGs for the tariff lines analyzed, using the average annual price data for imports in the period 1996 to 2015.



Source: Prepared by the authors based on data from WTO (2018a and b), USITC (2018), United (2018) and Eurostat (2018).

is verified that this was more severe for beef in the U.S. This observation, which did not occur in an isolated manner, but persistently within the application of more significant special safeguards on the global meat trade, raises doubts whether the SSGs are really being applied within import price conditions below the trigger, and not only considering normal annual price variations. In that case, even reforms to this mechanism could fail to be effective to reduce the protection levels.

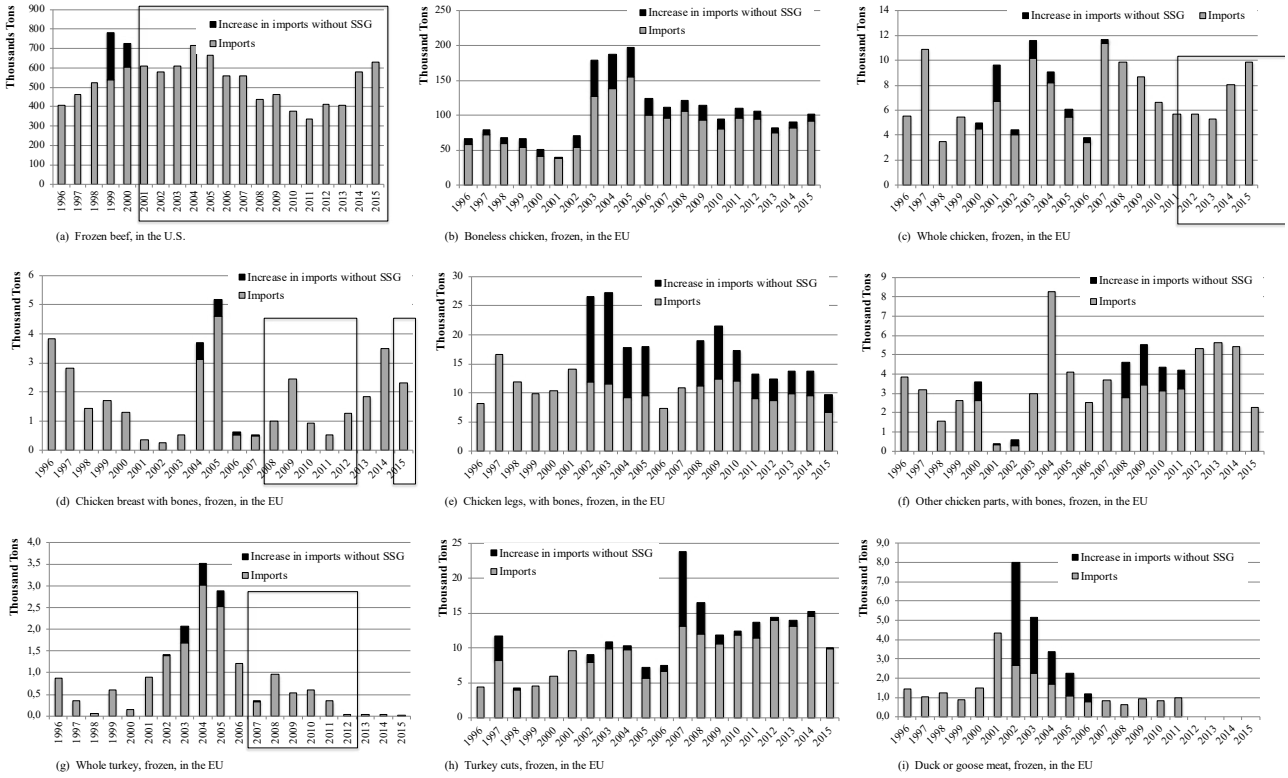
As previously mentioned, it is also verified in Figure 4 that the EAV extra quota tariff changes throughout the years, since different price levels are observed each year.

Figure 5 shows the volumes imported each year and the estimated volumes, calculated as described in equation (2), which were no longer imported due to the application of SSG. Since the import price elasticity is responsible for a significant share in the results, they are described in Figure 6. These values were calculated as presented in equation (3).

As expected, the estimated volume which was not imported due to the SSG is directly proportional to the scale of the additional tariff estimated and described in Figure. 4. However, the basic imported volume, which is the volume imported in the year of the SSG application is also important for this estimate, and the magnitude of the values, which can be observed in the axes of the charts in Figure 5, draws attention to this fact. The magnitude of the impact on the imported volume is observed in Figure 5(a) and 3(b) as quite superior to the others, indicating their greater significance for trade. Figure 5(a), which has the greatest import magnitude among the tariff lines analyzed, represents the SSG impact on beef imports in the U.S.

And, as presented above, this effect could only be estimated for the years 1999 and 2000, despite the U.S. having notified the use of SSG in all years up to 2015. Since this is a very large market, the magnitude of the impacts that could not be estimated, therefore, could be important for the global meats market. If we consider the impacts of beef and poultry reduction in the years of 1999 and 2000 due to the SSG estimated in this study, this value represents approximately 2.5 and 1.5% of the global trade of these meats, respectively, in the years 1999 and 2000. As for the other years, where only the

Fig. 5. Import volumes observed and estimate of what was not imported due to the application of an additional special safeguard tariff, applied by the U.S. and EU in the meats market, period 1996 to 2015.



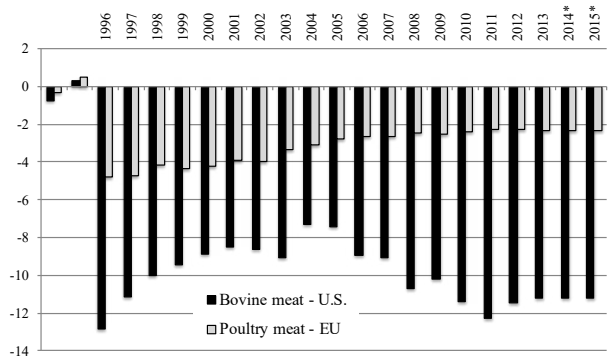
Source: Prepared by the authors based on data from WTO (2018a and b), USITC (2018), United (2018) and Eurostat (2018).

impacts on poultry were measured, the participation of these impacts in the global poultry market varied from 1.6% in 2003 to 0.1% in 2001, with an average of 0.5% for the period (except the years 1999 and 2000). These results also depend on the price elasticities considered.

Applying Brazil's participation in global exports of beef and chicken on each of the years studied for the estimated volumes that were not imported due to SSG application, we obtain an estimate of Brazilian exports that did not occur. Brazil's participation in beef trade varied from less than 10%, before 2000, to 20% from the mid-2000s decade. As for the poultry market, Brazilian participation was of 15% until the decade of 2000, and reached the threshold of approximately 35% from then on. By multiplying them by the basic prices of these products, which were obtained in Brazil's Input-Output Matrix of 2013, we obtain the demand shock values estimated for the Brazilian economy. The values of these shocks were approximately BRL 517 million for poultry and BRL 287 million for beef. Table 2 shows the results obtained from the impact of these values on the Brazilian economy.

The first observation about the results refers to the relatively low impact found in this study of the meat market when compared to those obtained for the sugar market (Costa *et al.*, 2015). In the latter, the impact in the period of 1995-2013 was approximately BRL 42 billion in gross production value (VBP) of the Brazilian economy and in the former, for an additional period of two years, from 1995-2015, the impact was less than BRL 4 billion in the VBP. Nonetheless, the trigger prices to activate SSG in sugar were quite high in regard to the prices practiced in the period, resulting in high levels of an additional tariff applied and, consequently, in the high impacts observed by Costa *et al.* (2015). In the case of meat, the trigger price was clearly higher only for one of the tariff lines analyzed (Boneless chicken, frozen, in the EU). As may be observed in the charts in Figure 4 and 5, most of the impacts could not be estimated due to prices observed above the trigger price. But in face of the fact that SSG applications were notified for those products and years, much of the impact certainly could not have been estimated in this study. This observation could be more important in this study than the impacts

Fig. 6. Values of the price elasticity of demand for imports (η^M) of beef in the U.S. and poultry in the EU.



Note: *The same value of the last year was considered due to the lack of data; is the demand price elasticity and the price elasticity of supply, both domestic, used as a basis to estimate the demand for imports.
Source: FAO (2018a); Fapri (2018).

estimated to show the relevance of minding the use of this mechanism.

The type I estimated impacts - which correspond to the direct and indirect effects of a demand shock, in addition to the actual sector that received the shock – were higher in the following sectors presented in decreasing order of impact: Other food products, Livestock, Trade. These sectors were the most impacted by the direct and indirect effects in all variables analyzed: production, GDP, remuneration/salary, employment and importation. However, as may be observed in Table 2, the impact of a growth in imports was quite small. This is a good result for the country's economy, for it is verified that the shock does not demand much from sectors highly dependent on imported products in the country.

It is verified that the impact with only the income effect, which is the difference between Type II and Type I impacts, represents an important portion of the total impact, corresponding to approximately 36% for GPV variables and number of jobs, and 47% for the remaining variables. Thus, while separating the income effect of the type II impact, we observe that the sectors most affected by this effect are different depending on the variable analyzed. Considering the gross production value (GPV), in addition to the actual sector that received the shock, the most impacted sectors in order of significance were: Trade, Real estate activities, Oil refining, Other food products, Food and Agriculture. In turn, considering the income effect of the impact on the GDP, the Real estate sector's activities were superior to those of Trade, followed by the sectors of Food and Agriculture. However, observing the impacts on employment, few sectors were relevant, with the following sectors standing out in this order: Trade,Livestock, Food, and Agriculture. Despite having a much lower impact than on those sectors, but still quite superior to the average of the country's sectors, and due to the income effect of the country's meat exports growth, the following sectors stood out in job creation: Associative organizations and personal services, Private education and Private health care.

5. CONCLUSION

The results illustrate how a trade protection mechanism, such as SSG – for which there are few analyses, and that should have been eliminated for having a transient character when adopted - presents expressive impacts on international meat trade and for the economy of a country that exports such products, as Brazil.

The use of special safeguards (SSG) for agricultural products has been an instrument with a high potential to enable increases in the consolidated tariffs at the WTO by member countries. Thus, it gains importance, mainly at periods of high relative supply of products and

Tab. 2. Estimated impact on the Brazilian economy of a demand shock in Brazilian meat exports: BRL 517 million for poultry and BRL 287 million for beef. Values in BRL million, at 2015 prices (for the "Job" variable, the results indicate number of people).

	Gross Production Value (GPV)	Number of people employed	GDP	Remuneration	Importation
Type I*					
Beef	817	9.721	344	120	31
Poultry	1.472	17.511	620	216	56
Type II*					
Beef	1.339	15.139	653	226	58
Poultry	2.411	27.272	1.176	407	104

Note: *Type I corresponds to the direct and indirect impacts and Type II to the impacts, besides those, also of the income effect.
Source: Research results.

reduced prices in the international market. In fact, when the prices of the international market are reduced, that increases the imported product's competitiveness in the importer country markets. With the reaction of these importers in the form of higher tariffs by the percentage provided in the agreements, there is a reduction in imports that increases an excess of the global supply, particularly when the countries that react are significant importers. As a result, prices could end up even lower in the international market. This characterizes a perverse effect associated to the deployment of SSGs, reinforcing the importance of measuring and analyzing its effects, as presented in this study.

It is worth noting that the transparency of the measurements for their evaluation could be improved, since the countries don't need to inform the value of the imposed tariff when notifying its application. Today, importers are only required to notify that they are using the SSG measure. Another aspect involves the fact that the price-based SSG is applied per ship, which also makes it difficult to obtain the actual cargo import price on which it was applied. An approximation consists in employing average annual prices for the commodity. Given such procedure cannot provide the exact value, there are cases in which the country declares the use of SSG and the actual import price calculated is not lower than the trigger price. Therefore, the results obtained can be underestimated, and it is important to analyze the results obtained with that reservation. This was identified, for example, in the case of the U.S. meats market. In that market, this effect could only be estimated for the years 1999 and 2000, despite the U.S. having notified the use of SSGs in all years up to 2015. Since it is a very large market, the magnitude of the impacts could not be estimated, therefore, they could be important for the global meats market and were not collected.

Despite these reservations, the results obtained in this study can subsidize future trade negotiations at the WTO. In addition, the study offers an analytic instrument that may be updated in a simple manner, providing a way to monitor the changes throughout different periods of time.

REFERENCES

Aznal M. (2007). Special products and special safeguard mechanism in WTO agriculture negotiation. Briefing Paper, 1.

Brazil. Instituto Brasileiro de Geografia e Estatística – IBGE. Available at: https://ww2.ibge.gov.br/home/. Download. Statistics. National Accounts, (accessed in 2018).

Costa C.C., Burnquist H.L., Guilhoto J.J.M. (2015). Special safeguard tariff impacts on the Brazilian sugar exports. *Journal of International Trade Law and Policy*, 14(2): 70-85. doi.org/10.1108/JITLP-05-2015-0010

EUROSTAT – European Commission. International trade. Data. Database. Available at: http://epp.eurostat.ec.europa.eu/portal/page/portal/international_trade/data/database, (accessed in 2018).

FAO – Food and Agriculture Organization of the United Nations (2002). FAO papers on selected issues relating to the WTO negotiations on agriculture. Rome.

FAO - Food and Agriculture Organization of the United Nations (2018a). FAOSTAT. Available at: http://www.fao.org/home/en. Statistics. Databases. Data. Food Balance. Available at: Commodity Balances - Livestock and Fish Primary Equivalent .

FAO - Food and Agriculture Organization of the United Nations (2018b). FAOSTAT. Available at: http://www.fao.org/home/en. Statistics. Databases. Data. Trade. Crops and livestock products.

FAPRI – Food and Agriculture Policy Research Institute (2018). Tools. Elasticities database. Available at: http://www.fapri.iastate.edu/, (accessed January 20th).

Finger J.M. (2009). A special safeguard mechanism for agricultural imports and the management of reform. World Bank: Policy Research Working Paper, n. 4927.

Guilhoto J.J.M., Sesso Filho U.A. (2005). Estimation of the Input-Output Matrix Based on Preliminary Data from National Accounts: *Applied Economics*. 9(2): 277-299.

Guilhoto J.J.M., Sesso Filho U.A. (2010). Estimation of the Input-Output Matrix Using Preliminary Data from National Accounts: Application and Analysis of Economic Indicators for Brazil in 2005. *Economy & Technology* UFPR/TECPAR. 6(23). DOI: 10.2139/ssrn.1836495

Harris D. (2008). Special safeguards and agricultural trade liberalization. Rural Industries Research and Development Corporation: *Australian Government. Publication*. 8(125).

Hertel T.W., Martin W., Leister A.M. (2010). Potential implications of a special safeguard mechanism in the World Trade Organization: the case of wheat. *World Bank Economic Review*, 1-30. https://doi.org/10.1093/wber/lhq010

Miller R.E., Blair P.D. (2009). Input-Output Analysis: Foundations and Extensions. Second Edition. Cambridge: Cambridge University Press.

OECD-FAO (2015). Agricultural Outlook 2015-2024. Available at: http://www.fao.org/3/a-i4738e.pdf.

Orcutt G.H. (1950). Measurement of price elasticities in international trade. *The Review of Economics and Statistics*, 32(2):117-132. DOI: 10.2307 / 1927649

Pal P., Wadhwa D. (2006). An analysis of the special safeguard mechanisms in the Doha Round of Negotiations. ICRIER Indian Council for Research on International Economic Relations. Working Paper, 189.

United Nations. Comtrade Database. Available at: https://comtrade.un.org/. Get Data. Extract data, (accessed in 2018).

USITC – United States International Trade Commission. Trade DataWeb. Available at: http://dataweb.usitc.gov, (accessed 2018).

Wolfe, R. (2009). The special safeguard fiasco in the WTO: the perils of inadequate analysis and negotiation. *World Trade Review*, 8(4): 517-544. DOI: 10.2139/ssrn.1353909

WTO – World Trade Organization (2018a). Available at: https://www.wto.org/ Document, data and resources. Documents Online search facility, (accessed in 2018).

WTO – World Trade Organization (2018b). Available at: https://www.wto.org/ Document, data and resources. Statistics. Tariffs. Tariff Analysis Online, (accessed in 2018).