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**TRQ-COMPLICATIONS: WHO GETS THE BENEFITS WHEN THE EU LIBERALISES
MERCOSUR'S ACCESS TO THE BEEF MARKETS?**

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Introduction

The Mercosur countries (Argentina, Brazil, Uruguay, Paraguay and Bolivia) are the most important providers of beef imports for the European Union (EU). Especially Brazil and Argentina, but to a lesser extent also Uruguay, account for a significant share of European beef imports. On 2004-2006 average, almost 90% of the EU's beef imports originated in the Mercosur countries.

This is at least partially explained by existing trade regimes: The EU-tariff on beef imports is especially high. The Most Favoured Nation (MFN) tariff equivalent for fresh beef is over 75%, the one for frozen beef up to 94%. Argentina, Brazil, Uruguay and Paraguay enjoy preferential access to the European beef market via three different trade regimes: First, the multilateral frozen beef quota. Second, the multilateral frozen beef quota for processing. Third, the bilateral tariff rate quota (TRQ) for high quality beef. Most of these quotas were negotiated under the provisions of the World Trade Organisation (WTO).

In the year 2000, the EU and the Mercosur countries engaged in the negotiation of a bilateral free trade agreement, including agricultural goods. The Mercosur countries requested a significantly increased access to the agricultural markets of the EU. The EU responded with a less ambitious proposal. Both proposals have in common that for so-called sensitive products, expansion of the existing bilateral TRQs for high quality beef is envisaged. In addition, reductions of the in-quota tariffs are stipulated. The two proposals differ in the extent of both TRQ expansions as well as tariff reduction.

The aim of this paper is to analyse who gets benefits when the EU liberalizes Mercosur's access to the beef markets. Two problems of analysis arise in this context: One is the high level of product aggregation, on which some TRQs, in this case those for beef, are defined. The second difficulty is the distribution of the windfall profits both on international as well as on national level, which is a priori unknown.

This paper provides a detailed assessment of the potential economic impact a liberalization of Mercosur's access to the European beef may have, involving a partial equilibrium model operating at a high level of product disaggregation. The welfare analysis carried out was facilitated by a consultation of experts from the meat sector, allowing the allocation of the quota rents to the different stakeholders involved into the business. From a methodological point of view, the paper adds to existing research showing how a modified Takayama-Judge approach can be highly suitable to answer questions of bilateral trade liberalization when a low level of product aggregation is appropriate.

The paper starts off with a description of the current trade preferences between the EU and the Mercosur countries. This is followed by an assessment of the utilization of the current preferences, which allows a first estimate on whether trade liberalization will in fact lead to increased trade between the two country blocks. After that, an analysis of the administration of the existing TRQs and the implications for rent distribution is presented. The model and the scenarios are described before results are presented, before conclusions from the analysis are drawn.

Current trade preferences and their utilization

Trade preferences

The Mercosur countries' beef exports currently benefit of trade preferences that the EU conceded mostly in the context of the WTO agreement on Agriculture¹. The preferences are granted through tariff rate quotas. There are both bilateral as well as multilateral arrangements through which the Mercosur countries have preferential market access.

Three preferential trading schemes can be distinguished:

1. The bilateral TRQs for high quality beef ("High quality beef quota")
2. The multilateral TRQ for frozen beef ("GATT frozen beef quota")
3. The multilateral TRQ for frozen beef intended for processing within the EU

Only certain tariff lines, defined on 8-digit level of the *combined nomenclature* of the EU qualify for imports at the preferential tariff rate. An overview of the three different TRQs is given in Table 1.

In the framework of the *high quality beef quota*, the bilateral preferences are not granted to the Mercosur countries as a group, but to individual member states. At this point in time, Argentina has with 28,000 tons the largest allocated TRQ, Paraguay with 1,000 tons the smallest. The MFN tariff is a composed tariff. It consists of a 12.8% ad valorem tariff and a specific tariff that varies between 303.4 and 304.1 Euro per 100 kg (WTO, n.d.). Depending on the country, the ad-valorem equivalent (AVE) of this tariff is roughly between 75% and 85%. The preferential rate is with 20% significantly lower

One of the specificities of these high quality TRQs is that not all beef corresponding to the tariff lines covered by the TRQ is eligible for the TRQ. Additional criteria related to quality aspects have to be fulfilled. These comprise mainly requirements regarding the carcass grading, meat quality, the age of the animal and the feed on which the animal has been fattened (COMMISSION OF THE EUROPEAN COMMUNITIES, 1997).

¹ An exception to this rule is the TRQ for high quality beef granted to Paraguay, that was opened as an autonomous quota.

Table 1 Preferential schemes for beef imports of the EU originating in the Mercosur countries

eligible country	quota quantities (tonnes)	MFN rate	preferential rate
High quality beef quota			
Argentina*	28,000	12.8% + 303.4-304.1 EUR/100KG	20%
Brazil**	5,000		
Paraguay***	1,000		
Uruguay**	6,300		
GATT frozen beef quota			
World****	53,000	12.8% + 141.4-304.1 EUR/100KG	20%
Frozen beef for processing			
World*****	50,700	12.8% + 141.4-304.1 EUR/100KG	12.8%+99.45-213.84 EUR/100KG

* For tariff lines 020130 and 02061095 of the *combined nomenclature*

** For tariff lines 020130, 02023090, 02062991 and 02061095 of the *combined nomenclature*

*** For tariff lines 020130 and 02023090 of the *combined nomenclature*

**** For tariff lines 0202 10 00, 0202 20 10, 0202 20 30, 0202 20 50, 0202 20 90, 0202 30 10, 0202 30 50, 0202 30 90, 0206 29 91

***** For tariff lines 0202 20 30, 0202 30 10, 0202 30 50, 0202 30 90, 0206 29 91

The *GATT frozen beef quota* is open to all WTO member countries. It covers frozen carcasses, half carcasses, cuts with bone in as well as boneless beef cuts and meat offals. The MFN tariff is also a composed tariff, with an AVE ranging between 66% and 94% depending on the exporting nation. The preferential rate is fixed at 20%.

The *TRQ for frozen beef for processing* finally covers frozen beef cuts (with or without bone) and offals that are also eligible for the GATT frozen beef quota. The AVE of the MFN tariff is over 115%. The in-quota tariff is the sum of a 12.8% ad valorem tariff and, in some cases, a specific tariff that ranges between 99 and 214 Euros per 100 kg. This translates into a AVE of the preferential tariff between 12.8% and 90%.

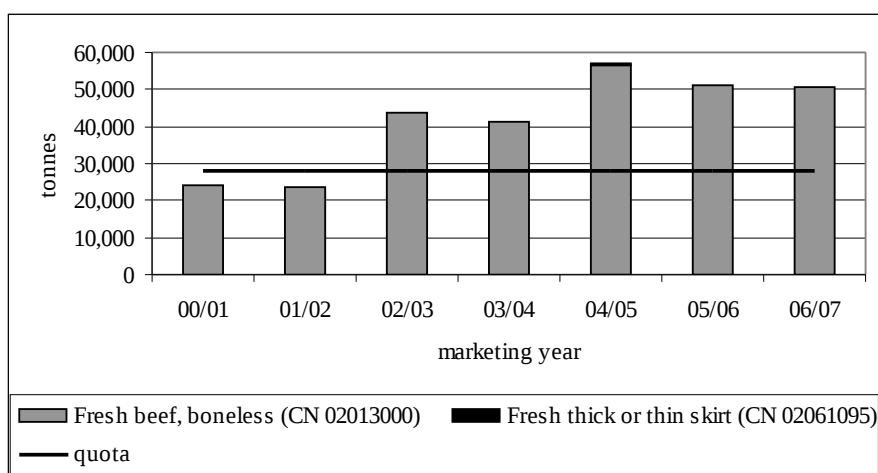
Utilization of the current preferences

It is a well known fact that the effect of liberalization of different quota elements hinges on the TRQ regime that was in place prior to the policy change (see for example MÖNNICH, 2003, BOUGHNER ET AL., 2000). For this reason, analysis of the fill rate of the different TRQs is carried out in the following, again starting with the high quality beef TRQs, followed by the two TRQs for frozen beef.

The shipments of beef that qualifies for the high quality beef quota allocated to *Argentina* are depicted in Figure 1². It is obvious that though high quality fresh beef cuts (CN 01013000) and offals (CN 02061095) are eligible for the TRQ, virtually only fresh beef cuts are traded. It also becomes clear that with the exception of the marketing years 2001 and 2002, where Argentina was hit by a severe epidemic of Foot and Mouth Disease (FMD) and trade was restricted due to sanitary reasons, the quota was notably over filled. In other words, despite the high MFN tariff, Argentinean beef was competitive on European markets even when the full levy had been charged.

² It should be stressed that these are imports of beef that can be potentially be imported under the preferential tariff, but this is by no means certain. This uncertainty relates to the additional quality requirements that are not captured in the international trade databases. Despite considerable effort, no information on this issue could be retrieved. This caveat has to be made for the subsequent analysis of imports from Brazil and Uruguay, too.

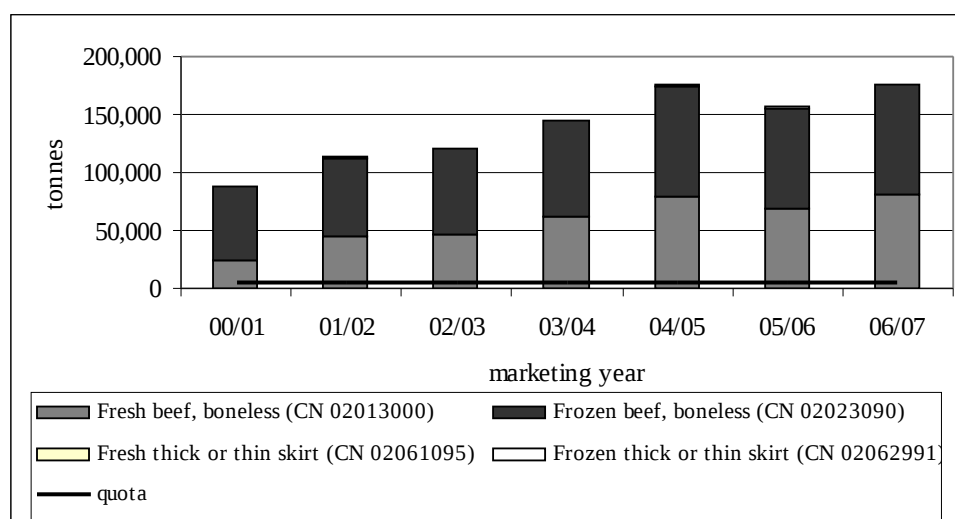
Figure 1 EU imports of beef eligible for the high quality beef TRQ from Argentina



Source: Own compilation based on (EUROSTAT, n.d.)

This is even more pronounced for high quality beef originating in *Brazil*, where imports within the quota hardly play a role compared to the quantities that are imported paying the full levy. This underlines the low cost of production and high competitiveness of Brazilian beef. A complication in the case of Brazil is that the high quality TRQ is open to four product specifications, of which two can be traded under the multilateral schemes for frozen beef, too. While only trade of fresh and frozen beef muscle cuts plays a role, it can not be distinguished whether the frozen cuts are imported under the bilateral scheme for high quality beef, the multilateral scheme for frozen beef or at full levy.

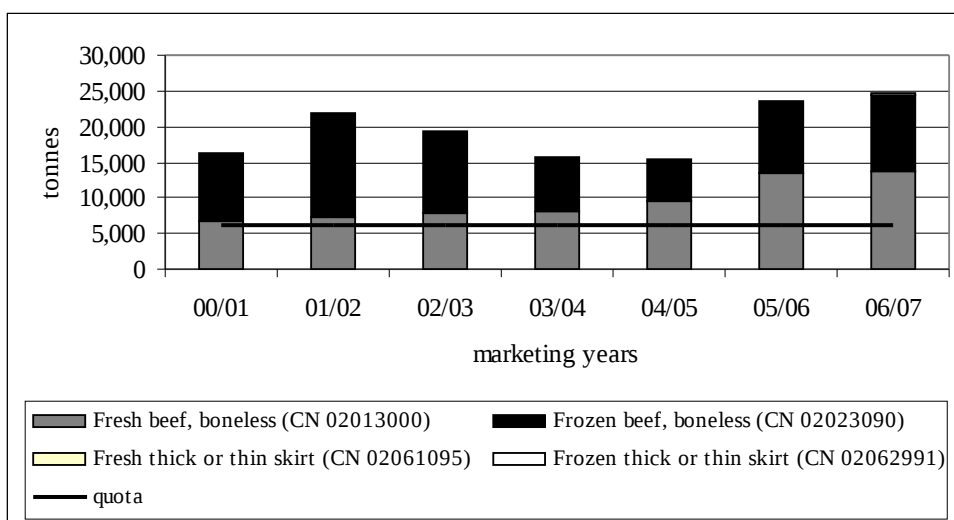
Figure 2 EU imports of beef eligible for the high quality beef TRQ from Brazil



Source: Own compilation based on (EUROSTAT, n.d.)

The problem of differentiating between imports under different preferential trading schemes also arises in the case of *Uruguay*, which is presented in Figure 3 below. Again, both boneless fresh and frozen beef can be imported under the quota. In any case, even if only imports of fresh beef are taken into account, the quota is over-filled, and imports take place to an increasing degree at full levy.

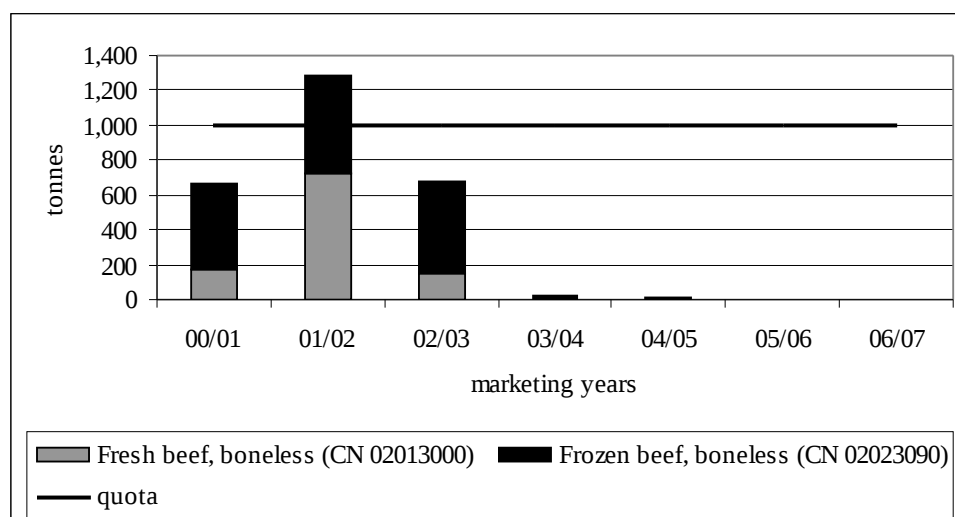
Figure 3 EU imports of beef eligible for the high quality beef TRQ from Uruguay



Source: Own compilation based on (EUROSTAT, n.d.)

Paraguay has only a small allocated quota, and, as can be seen in Figure 4, has hardly been able to benefit from this trade preference to the full extent. Since the marketing year 2003/2004, imports of beef pertaining to the tariff lines to which the TRQ is open have virtually ceased. Paraguay is therefore not further considered for this study.

Figure 4 EU imports of beef eligible for the high quality beef TRQ from Paraguay

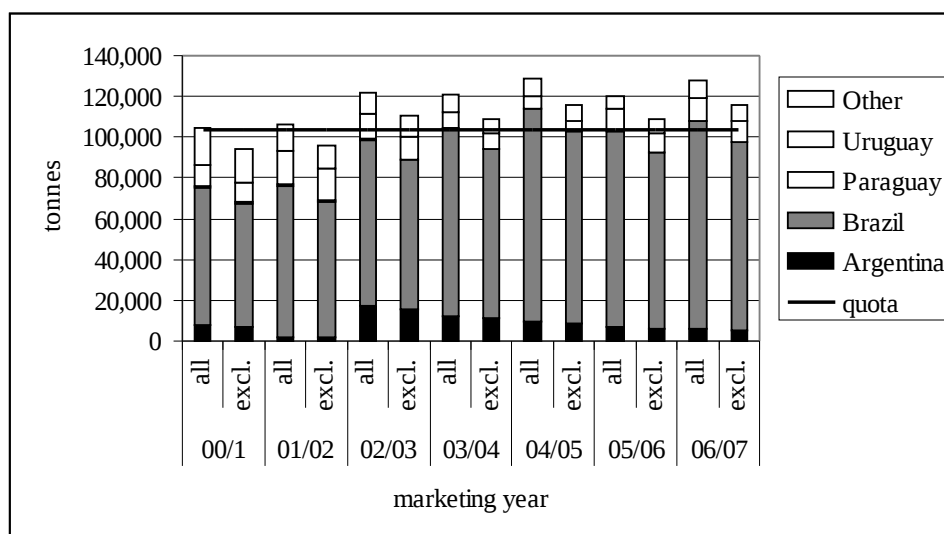


Source: Own compilation based on (EUROSTAT, n.d.)

In summary, it can be said that with the exception of Paraguay, all Mercosur countries that have allocated TRQs for high quality beef ship beef at full levy into the EU, i.e., the quotas are over-filled and quota rents are generated. Yet, the degree of overfill can not be unambiguously determined due to the overlap with tariff lines that are also eligible for other preferential trading schemes.

To gain more insight into the latter issue, imports of beef that corresponds to the tariff lines that are covered by the multilateral TRQs are presented in Figure 5. Two different aggregations have been made: For the columns named “all”, imports of *all* products that qualify for the multilateral beef TRQ have been aggregated, including those that also qualify for the bilateral high quality beef quotas. For comparison, a second aggregation has been made, where exclusively those imports have been aggregated, that qualify only for the frozen beef TRQ, not for the bilateral TRQs. This aggregation is denominated with “excl.” in Figure 5.

Figure 5 EU imports of frozen beef



Source: Own compilation based on (EUROSTAT, n.d.)

Abstracting from the years in the beginning of the millennium in which the severe FMD epidemic struck South America and Europe, in either way of aggregation, the multilateral frozen beef TRQ is over-filled. Another feature is that other countries than those belonging to the Mercosur, account only for small shares of European imports of frozen beef.

Since it is impossible to tell under which (if at all) scheme the products that are eligible for more than TRQ are imported, for this study it has been assumed that under the TRQs for high quality beef, only fresh beef is imported. Frozen beef that could in principal be imported under the high quality TRQs, is assumed to be imported either at full levy or under the multilateral frozen beef TRQs.

Quota administration and rent distribution

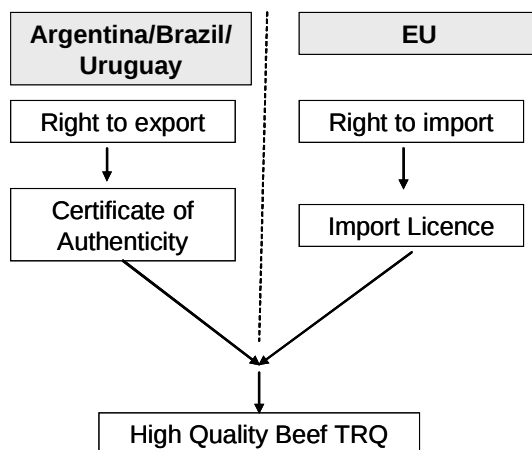
BOUGHNER ET AL. (2000) point out that the distribution of the rents is heavily dependant on how the quota is administrated, especially if and if so, to whom import or export licenses and thus the right to trade are allocated. In a competitive setting without bargaining power, the right to trade implies the right to obtain at least a share of the rent. This is not necessarily true when imperfect competition, bargaining power and vertical integration are introduced.

The bilateral TRQs for high quality beef

For the bilateral TRQ for high quality beef, the European Union has chosen to administer the importing side and the exporting side through import and export licenses respectively. An overview over the administrative procedure is given in Figure 6: Both on the exporting and importing side, the actors

involved in the business have to apply for the right to export or to import under the preferential scheme at administrative bodies in the respective country.

Figure 6 Administration of high quality beef TRQs



Source: Own representation

Once traders have the right to trade a certain quantity under the preferential tariff, for each unit they wish to trade they have to request a specific document. On the exporting side, the document is a so-called certificate of authenticity; on the importing side it is called an import license. Both documents are needed in order to benefit from the in-quota tariff.

The right to *import* is given to firms in the European Union, and the licenses are issued by administrative bodies within the European Union. A detailed description of the rules to be followed is given by the COMMISSION OF THE EUROPEAN COMMUNITIES (1997). In summary, the import licenses are granted on a license-on-demand basis. If the total quantity requested exceeds the available quantity, the requests are cut pro rata.

The EU has transferred the right to ration the *exporting side* to the exporting countries. The authorities in the exporting countries allocate the rights to export and issue the certificate of authenticity. It states that the product to be exported fulfils the quality requirements.

Argentina has chosen to administer the right to export under the TRQ for high quality beef by assigning shares to various actors in the chain³. The recent legislation is laid down by the Secretary for Agriculture, Livestock Fisheries and Food (SECRETARÍA DE AGRICULTURA, 2004). Of the total quota quantity, 7 percent are assigned to cooperation projects between cattle producers and exporting slaughter houses. The remaining share of the quota is distributed between slaughter houses mainly as a function of their regional distribution and their past performance in beef trade.

In *Brazil* the right to export is granted only to exporting companies⁴, and not to producers or any other elements of the chain. The procedure how the quota is administered is defined by the Ministry for Industrial Development and External Trade (MINISTÉRIO DO DESENVOLVIMENTO INDÚSTRIA E COMÉRCIO EXTERIOR, 2006). The total amount of 5,000 tons for exportation is split up into two parts. 4,700 tons are distributed to established beef trading enterprises. Each participant has the right to a fixed quota of 24 tones and a variable part based on its export performance in the preceding year. The remaining 300 tones are reserved to new coming firms.

³ In the history of the TRQ for high quality beef, Argentina has amended the system constantly. An overview of the historical development can be found in BONANSEA ET AL., 2006.

⁴ These can be deboning facilities, slaughterhouses or pure trading companies.

In *Uruguay*, deboning facilities, slaughter houses and pure exporting companies can apply for a share of the quota based on past performance criteria. A detailed description of the rules for the distribution of the quota can be found in a publication of the National Meat Institute (JUNTA DEL INSTITUTO NACIONAL DE CARNES, 2003). In addition, up to 6 percent of the total quantity or 378 tones can be distributed to so-called innovative projects that the National Meat Institute wants to promote, though this did not play a role at the time when the research for this paper was carried out.

In the case of the bilateral TRQs for high quality beef, both the exporting side and the importing side are issued licenses and therefore afforded bargaining power. Under perfect competition, this would imply that the rents are shared between the two parties. If a different market structure prevailed, the outcome could be expected to be different.

The consultation of industry experts carried out in Argentina, Brazil and Uruguay revealed that the rents generated from the over-filled high quality beef TRQs are fully captured by the exporter. With the certificate of authenticity that is issued to the exporter, he or she is perfectly informed on the tariff that the importer has to pay when shipping the commodity to the EU. It has been stated by the interview partners that a different price is charged to the importer, depending on whether the cuts are exported within the quota or not. In practice, the price of exports within the quota is determined by market research or based on past experience. The (lower) price for the same cut without the certificate of authenticity is then derived by deducting the tariff differential.

This price setting behavior is possible for several reasons. The probably most important one is that beef accompanied by a certificate of authenticity is scarce. Exporters can to some degree exercise market power over the importers. Whereas the exporting firms in Argentina and especially Brazil are well organized, the importing sector in the EU is rather fragmented, leaving the exporting side with bargaining power.

Within the exporting countries, the rent remains with the entity that has been assigned the certificate of authenticity (meat processing and trading companies in Brazil and Uruguay, and additionally farmers associations in Argentina) and therefore the right to export. In none of the three countries, bargaining power within the meat production chain, vertical integration or other market structures that would suggest an alternative distribution were found.

Multilateral beef TRQs

For the *GATT frozen beef TRQ*, there is no administration of the exporting side. The control of the quantities imported takes place exclusively in the EU. Importers based in the EU can apply for a share of the frozen beef TRQ based on their historic imports of fresh and frozen beef as well as edible offal of bovine animals (COMMISSION OF THE EUROPEAN COMMUNITIES, 2004). No export licenses are needed to match the import license, therefore exporters have no information on the tariff that is going to be charged on their commodity. Hence, the rent is captured entirely by importers in the European Union.

For the administration of the *TRQ for frozen beef for processing*, the same holds true as for the *GATT frozen beef TRQ*: There is no administration of the exporting side. Inside the EU, import rights are allocated to meat processing establishments which will then be issued an import license. There is no past performance criterion for this TRQ, meat processing companies can apply for as many import rights as they wish. If there are more applications than quota quantity, the European Commission will decide on a percentage cut for each application (COMMISSION OF THE EUROPEAN COMMUNITIES, 2005). As no export licenses are needed and therefore the importers are able to capture the rents accruing from this TRQ.

The model

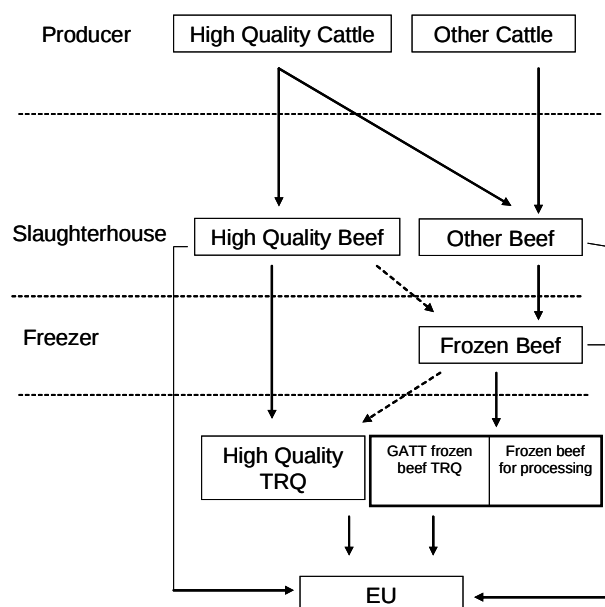
The aim of this chapter is to provide information on the model that was set up specifically for the analysis of the EU's and Mercosur's proposals with regards to liberalization of beef trade.

The problem to model

The relations to be modeled between production, processing and trade policies of beef of different qualities are complex. A schematic overview of these relations is given in Figure 7.

As mentioned, the requirements for the high quality beef quota relate not only to special cuts, but also to certain methods of production. Thus, the decision of producing an animal that will supply high quality beef is already taken on farm level. However, as only special cuts qualify as high quality beef, with each animal of high quality slaughtered there will also be a certain percentage of beef meat of other quality. This special characteristic of beef production represents a Leontief technology.

Figure 7 The problem to model



Source: Own representation

The resulting two types of fresh beef can be frozen and thus converted into frozen beef.

Finally, there are four different channels through which beef from Argentina, Brazil and Uruguay can enter the EU: The high quality beef TRQs, the two multilateral TRQs for frozen beef and the MFN regime. Of course, all types of beef can be consumed domestically or exported to other destinations than the EU too, but this is not depicted in Figure 7 for the ease of representation.

Most of these relations are captured by the model. Only the two multilateral TRQs for frozen beef are merged into one, and the possibility of freezing high quality beef for importation under the high quality TRQ (indicated through dashed arrows) has been abstracted from. For Argentina this reflects the current legal situation, but exporters in Brazil and Uruguay could in fact choose to freeze high quality cuts and export them either under their TRQ for high quality beef or under the multilateral scheme for meat for processing. The main reason for not taking this possibility into account in the model is the minor role this seems to play, but ultimately the lack of information.

General features of the model

The model set up for this study belongs to the class of partial equilibrium model. The model is formulated as a spatial price equilibrium models (SPE). Bilateral trade flows are modelled indirectly through a highly disaggregated commodity specification: Meat is not only characterized by its quality and processing stage, but also by its origin. For instance, beef produced in Argentina is seen as a different product as beef produced in Europe, and imports and exports of the seemingly same commodity are therefore possible.

As the model aims at specifically analyzing trade between the EU and the Mercosur countries, four countries and a “Rest-of-the-World” aggregate are included: The European Union, Argentina, Brazil, Uruguay and the Rest-of-the-World aggregate. Paraguay, the associated members Bolivia and Chile are not included, neither is Venezuela which has become full member of the Mercosur in 2006. This is justified by their negligible role in beef trade.

To allow for the most precise representation of TRQs and the arising quota rents, the model was formulated as a Mixed Complementarity Problem (MCP), that links each model equation with a shadow variable, exploiting the so-called Kuhn-Tucker conditions (see NZIER (2001), CHIANG (2005)).

To best reflect the relationships represented in Figure 7, two categories of cattle are distinguished in the model. From these animals, three different kinds of meat are produced. A compound type of meat was introduced in a reduced form to better reflect substitution effects in the consumers’ utility function. This leads to a total of six product categories: 1) High quality cattle, 2) other cattle, 3) fresh beef of high quality, 4) other fresh beef, 5) frozen beef, 6) other meat products. Each of these product categories is additionally typified by the country of origin. This renders a total of 30 products in the model.

For a thorough welfare analysis, the actors involved into the business have to be distinguishable in the model. Thus, four economic actors are represented in the model: 1) Farmers, 2) slaughterhouses, 3) freezers and 4) consumers. The distinction between slaughterhouses and freezers is somewhat artificial: In reality, chilling and freezing certainly takes place in the slaughterhouse itself. The reason behind the distinction here is that it eases explicit modelling of processing fresh to frozen beef depending on profit margins.

For the actors in this model, profit or utility maximizing behaviour is assumed. There are behavioural functions for

- farmers’ supply of live animals
- the demand of slaughter houses for live cattle
- the demand of the deep freezing unit for fresh beef for freezing
- consumers’ demand for different meat types

The supply function of farmers as well as the demand function of slaughterhouses for live cattle is derived via Hotelling’s Lemma from a normalized quadratic profit function.

Consumers’ demand functions are derived from indirect utility functions via Roy’s identity. The demand system employed in this model has been taken and adapted from RYAN ET AL. (1999) and is known as the Generalized Leontief Quadratic Expenditure System.

In addition to the behavioural functions, the model features, among others,

- supply of meat derived from the demand for live animals (slaughter house) or fresh meat (freezing unit) with technical coefficients
- market clearing equations
- spatial arbitrage conditions

- equations determining the quota rent

for each type of meat.

A more detailed model description including the respective equations is available upon request from the first author of this paper.

Model calibration

Theoretical consistency, defined as the capability of the functional forms to reflect the assumed theoretical properties (LAU, 1986), is one desired property of the functions used in a model. Choosing an appropriate functional form is one step towards a theoretically consistent system of behavioural functions. If through this choice not all the conditions for consistency with the assumed economic behavior are satisfied, the chosen parameters must be determined in a way that the desired properties are guaranteed. This approach was taken here.

In the calibration process, the parameters of the behavioural functions are treated as variables. Their values are not completely free, but a priori information from other studies was used. Where available, econometrically estimated elasticities taken from other studies were used as a benchmark from which the deviation was minimized under a set of constraints.

The calibration process can thus be seen as an optimization process under constraints, providing

1. elasticities that are as close as possible to the a priori information
2. parameters that render behavioural equations with the desired properties

For farmers' supply and the demand of the processing industry, homogeneity of degree zero in prices is guaranteed through the functional form. Correct curvature is not automatically given, and must be ensured through the values of the matrix of substitution terms (or slope parameters). Regarding the correct curvature, to produce a profit function that reflects the assumed behaviour, the matrix of substitution terms of supply has to be positive semidefinite. This is ensured by a Cholesky decomposition. Furthermore, the calibrated elasticities must add up to zero. This is achieved by forcing the sum of own and cross price elasticities for each product to zero. Finally, the set of parameters minimizing the square deviation of the calibrated elasticities from the original ones is found by an optimization process.

For human consumption, the functional form chosen ensures budget exhaustion and homogeneity of degree zero in prices and income. The slope parameters must therefore only ensure the correct curvature and fulfil the symmetry conditions.

In the calibration process, it is ensured that the Hessian matrix is symmetric; moreover, the off-diagonal elements of the Hessian matrix are forced to be greater than zero and the diagonal elements to values smaller than zero.

These restrictions imply two things: One is that negative own-price effects are assured. The other one is that positive cross-price effects in combination with negative own-price effects guarantee that the Hessian Matrix of the expenditure function is negative semidefinite and therefore correct curvature is achieved⁵. In practical terms the condition posed on the off-diagonal elements states that all goods are Hicks substitutes, and no complementary relations between two goods are allowed for.

⁵ For calibration of the parameters of the demand function, a Cholesky-decomposition is not necessary as long as only Hicksian substitutes are allowed for. Then, all the cross-price effects are forced to positive values. This ensures concavity of the expenditure function (and therefore a negative semidefinite Hessian matrix).

As in the case of the derivation of the parameters for supply and for demand of the processing industry, the parameters are forced to values that translate into elasticities as close as possible to given ones and at the same time are in line with the assumed micro-economic behaviour.

Data sources and processing

The model is calibrated to a 3-year average over 2004-2006. Information on production of animals of different types, consumption of meat cuts and prices was, where available, taken from national sources like the *Indicadores del Sector Vacuno* of the *Secretaría de Ganadería, Alimentos y Pesca* in the case of Argentina, *Instituto Brasileiro de Geografia e Estatística* (IBGE) for Brazil and the *Instituto Nacional de Carnes* in the case of Uruguay. For the EU, data were obtained from Eurostat, and for the Rest-of-World aggregate from the FAO and the OECD.

It was rarely possible to obtain the full dataset needed from national or international statistics. In those cases, approximations had to be made based on available information, or technical coefficients obtained from the industry consultation were applied to derive the necessary information.

Trade data was taken from Eurostat on 8-digit level for all trade flows involving the EU, and from the United Nations COMTRADE database else. The trade data had to be matched to the product aggregation for this model. This was done making three assumptions: 1) High quality beef is traded fresh or chilled, but never frozen, 2) Beef of other quality can be fresh or frozen 3) The composite commodity “other meat” consists of pork, sheep and goat meat as well as poultry.

When compiling data from different sources, the data set is very unlikely to be balanced initially. A procedure was set up to make the data consistent with the assumptions that markets are in equilibrium in the initial state. An optimization procedure under constraints was set up, that minimizes the percentage difference from the original data and at the same time renders a balanced data set. In this process, trade data was fixed, so adjustments were made only to consumption and production data.

Generally, errors that are made in this step of data sampling and compilation are unlikely to be decisive for the assessment of the trade liberalization scenarios. Production capacities were never considered as a limiting factor as regards the ability to benefit from trade liberalization.

Scenarios

This assessment of who gets the benefits when the EU liberalises Mercosur’s access to the beef markets is based on the proposals presented by the two negotiation parties published in 2005. The analysis based on the EU’s proposal will hereinafter be referred to as the *EU-proposal*, the proposal presented by the Mercosur countries as the *Mercosur-proposal*.

For the beef sector, the *EU-proposal* includes, in the absence of a conclusion of the Doha round, the expansion of the existing TRQ by additional 100,000 tones of high quality beef. According to this proposal, the in-quota tariff shall be fixed at “50 percent of the lowest of the bound in-quota duty rates for the existing WTO bound tariff quotas for the relevant product” (USDA, 2005). In the case of the beef TRQs of the EU, this materializes into an in-quota tariff reduction of 50 percent. The over-quota tariff remains unchanged. The *EU-proposal* does not contain any provisions on how to allocate the additional quota quantities among the Mercosur countries, but the industry consultation that was carried out in the framework of this study revealed an intra industry agreement that lays down the distribution of the additional quota among the Mercosur countries. The agreed distribution of additional quota quantities as well as the resulting total quota quantities for high quality beef are presented in Table 2.

Table 2 Trade liberalization proposals

	EU-Proposal		Mercosur-Proposal		
	Agreed distribution	additional quota (tonnes)	total quota (tonnes)	additional quota (tonnes)	total quota (tonnes)
Argentina	29.5%	29,500	57,500	88,500	116,500
Brazil	42.5%	42,500	47,500	127,500	132,500
Uruguay	21.0%	21,000	27,300	63,000	69,300
Paraguay	7.0%	7,000	8,000	21,000	22,000
Sum	100%	100,000	140,300	300,000	340,300
<i>in-quota tariff reduction</i>					
		50%			100%

Sources: Own calculations based on (USDA, 2005), personal communication with the Commission of the European Union and industry representatives.

The Mercosur proposal differs from the proposal made by the European Union mainly in two points: First, the additional quantities of high quality beef that were requested are three times higher than the EU offer. Instead of additional 100,000 tones as offered by the EU, the Mercosur countries requested 300,000 tones of additional quota for high quality beef. Second, the Mercosur countries requested the abolition of the in-quota tariff instead of a reduction as proposed by the EU. Allocation of the quota among the Mercosur countries would also be achieved according to the abovementioned intra industry agreement, leading to the additional quota presented in Table 2.

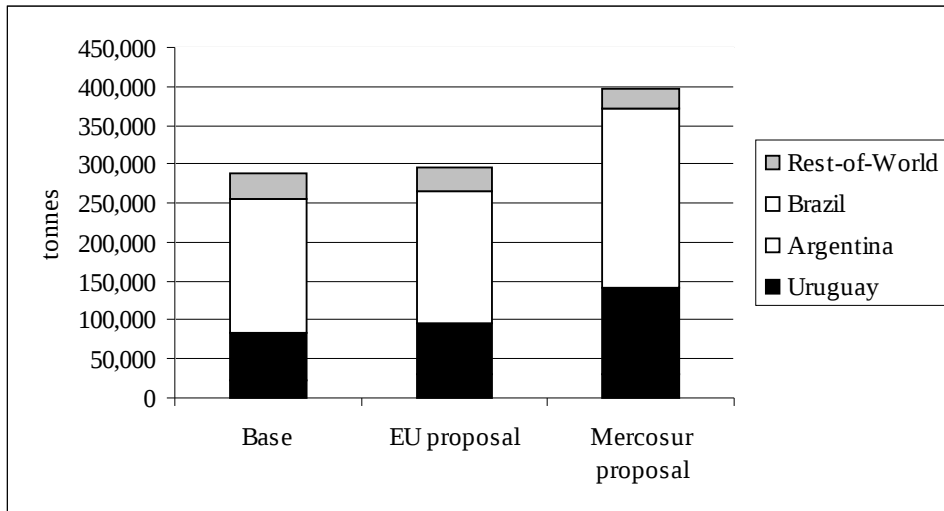
Results

Impact on trade flows

The development of beef trade between the EU and the Mercosur countries under both scenarios is presented in Figure 1.

The first observation is that under the EU proposal, the expansion of imports is very limited: Total beef imports of the EU increase by only 2 percent or slightly less than 8,000 tones. This stands in sharp contrast to the expansion of the high quality TRQs by more than ten times this quantity. This limited response of trade flows to the new conditions is explained by the quota-overfill in the base situation. As described in SKULLY (2001), expansion of an over filled quota does not lead to creation of new trade if the quota remains over filled in the new policy environment.

Figure 8 EU imports of beef



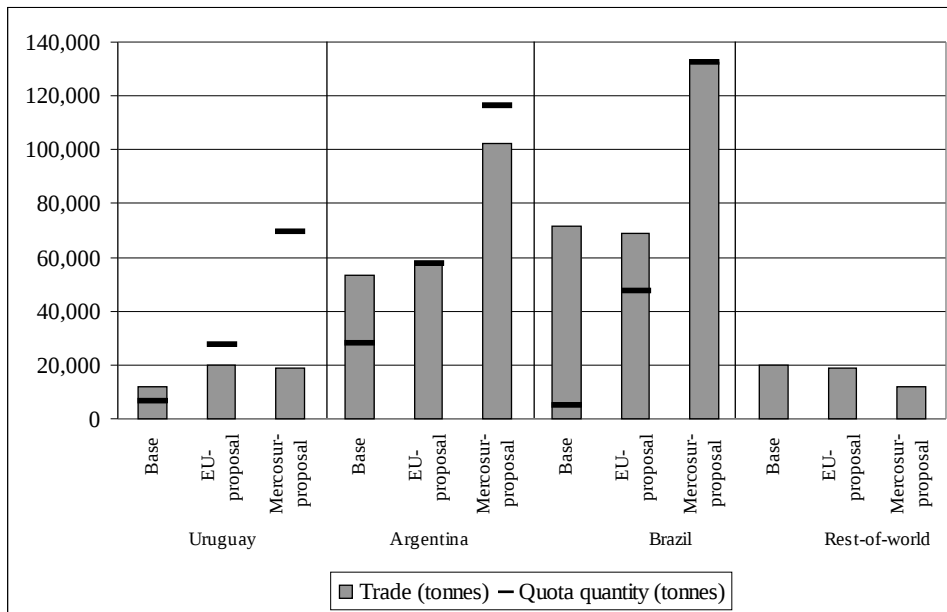
Source: Model results

The second observation is that under the *Mercosur proposal*, the shipments of beef meat into the EU increase much stronger than under the provisions set out in the *EU-proposal*. Under the *Mercosur-proposal*, the EU purchases more than 100,000 additional tones of beef meat from the South American free trade area, which is equivalent to an increase of almost 37 percent compared to the base situation.

The third striking point is that under both scenarios, imports from other countries than Argentina, Brazil and Uruguay remain rather stable, indicating limited substitution effects.

While giving an overview, the aggregated representation in Figure 1 hides away some interesting detail. A more disaggregated view on the development of imports of the EU from the Mercosur countries is presented in Figure 9, where the developments of trade only of high quality beef are shown.

Figure 9 EU imports of high quality beef



Source: Model results

The model results indicate that Uruguay, that in the base situation exports the smallest quantities of beef to the EU, increases its exports to the latter country group by almost 65 percent under the conditions set out in the *EU-proposal*. Already under these relatively modest provisions, this small country does not fill the allocated quota anymore. The same finding holds true for the more far reaching *Mercosur-proposal*, but what is more, exports of high quality beef from Uruguay to the EU decrease slightly compared to the *EU-proposal*, as meat originating in Uruguay is crowded out by meat originating in other Mercosur countries.

For Argentina the picture is different. With considerable quantities exported at full levy in the base situation, the trade expansion under the *EU-proposal* follows the quota expansion, and the quota becomes the binding element in the trade regime. As the quota was over-filled in the base situation, this materializes into only slightly more than 4,000 additional tones of high quality beef from Argentina on the European market. The expansion of exports is far less than the additional quota of 29,500 tones allocated to this country. Under the *Mercosur-proposal* however, exports stay behind the largely increased quota. Imports of the EU of Argentinean high quality beef increase by over 48,000 tones or almost 90 percent compared to the base situation.

Brazil has, in the current situation and despite its considerable exports, the smallest allocated quota among the three Mercosur countries considered here. Consequently, the *EU-proposal* does not provide this South American state with any further trade opportunities, the quota remains over-filled and the over-quota tariff the binding instrument. On the contrary, Brazil even reduces its exports to the EU slightly under this scenario, a development that can be explained by competing exports from the other two Mercosur countries. If on the other hand, an agreement was based on the bid of the South American country group, shipments of high quality beef from Brazil to the EU would increase considerably to over 132,000 tones, which implies a more than 85 percent increase compared to the base situation.

The above discussion shows that the *Mercosur-proposal* would de facto provide Uruguay and Argentina with a tariff and quota free access for high quality meat to the European market. Brazil on the other hand would be bound by the enlarged quota.

Welfare analysis

A natural question is the one for winners and losers of a possible understanding between the EU and the Mercosur countries. To answer this question, a welfare analysis for the different countries and actors involved was carried out.

An overview of the welfare changes is given in Table 3. It shows that both trade liberalisation scenarios would result in increased global welfare, though the absolute changes are small. Another salient feature of the welfare effect is that the EU would incur losses if an agreement was to be based on its own proposal, and for Uruguay, both liberalisation proposals would imply a negative welfare effect, though small in absolute terms.

Overall, the relative changes may appear high when compared to other welfare analysis. This is because changes are relative to the welfare generated in the meat sector only, whereas in studies that cover a larger part of the economy, the base is normally larger and therefore the change relative to this enlarged base is smaller.

Table 3 Welfare changes compared to the base situation

		EU-proposal	Mercosur proposal
European Union			
Farmers	<i>percent</i>	0.0	-0.5
	<i>absolute (Mio. EURO)</i>	-4.6	-53.1
Meat processing	<i>percent</i>	0.0	-0.4
	<i>absolute (Mio. EURO)</i>	-3.3	-36.3
Quota rent	<i>percent</i>	0.0	0.0
	<i>absolute (Mio. EURO)</i>	0.0	0.0
Consumers	<i>percent</i>	0.1	1.0
	<i>absolute (Mio. EURO)</i>	96.8	989.0
Budget	<i>percent</i>	-47.0	-87.6
	<i>absolute (Mio. EURO)</i>	-280.6	-523.2
Total	<i>percent</i>	-0.2	0.3
	<i>absolute (Mio. EURO)</i>	-191.6	376.4
Uruguay			
Farmers	<i>percent</i>	2.5	2.6
	<i>absolute (Mio. EURO)</i>	7.8	7.9
Meat processing	<i>percent</i>	0.1	0.1
	<i>absolute (Mio. EURO)</i>	1.5	1.4
Quota rent	<i>percent</i>	-100.0	-100.0
	<i>absolute (Mio. EURO)</i>	-16.5	-16.5
Consumers	<i>percent</i>	-3.1	-3.3
	<i>absolute (Mio. EURO)</i>	-16.9	-18.3
Budget	<i>percent</i>	0.0	0.0
	<i>absolute (Mio. EURO)</i>	0	0
Total	<i>percent</i>	-0.3	-0.4
	<i>absolute (Mio. EURO)</i>	-7.6	-9.0
Argentina			
Farmers	<i>percent</i>	0.4	2.0
	<i>absolute (Mio. EURO)</i>	12.9	69.6
Quota rent	<i>percent</i>	137	-100
	<i>absolute (Mio. EURO)</i>	7.2	-5.2
Meat processing	<i>percent</i>	1.2	1.0
	<i>absolute (Mio. EURO)</i>	112.3	89.0
Quota rent	<i>percent</i>	137	-100
	<i>absolute (Mio. EURO)</i>	95.4	-69.4
Consumers	<i>percent</i>	-0.1	-1.5
	<i>absolute (Mio. EURO)</i>	-9.6	-112.7
Budget	<i>percent</i>	2.1	27.8
	<i>absolute (Mio. EURO)</i>	4.1	53.5
Total	<i>percent</i>	0.6	0.5
	<i>absolute (Mio. EURO)</i>	119.7	99.4
Brazil			
Farmers	<i>percent</i>	-0.1	2.3
	<i>absolute (Mio. EURO)</i>	-1.4	54.4
Meat processing	<i>percent</i>	1.5	1.4
	<i>absolute (Mio. EURO)</i>	133.3	124.1
Quota rent	<i>percent</i>	1,013	9
	<i>absolute (Mio. EURO)</i>	136.8	1.2
Consumers	<i>percent</i>	0.0	-0.6
	<i>absolute (Mio. EURO)</i>	1.5	-99.7
Budget	<i>percent</i>	0.0	0.0
	<i>absolute (Mio. EURO)</i>	0	0
Total	<i>percent</i>	0.5	0.3
	<i>absolute (Mio. EURO)</i>	133.5	78.8
World			
Total	<i>percent</i>	0.0	0.1
	<i>absolute (Mio. EURO)</i>	66.5	631.2

Source: Model results

The established model allows for analysis of welfare changes on more disaggregated level. For the EU, three sub-items of national welfare contribute to the losses under its own proposal: The farm sector and the meat processing industry experience welfare losses due to the increase competition from South America. The state revenue is reduced because less tariff revenue is generated. This is an outcome of both the

reduced in-quota tariff for imports of high quality beef and the regime switches for Argentina und Uruguay and the expanded TRQ for Brazil. The loss of tariff revenue accounts for the bulk of the total losses. The positive income effect for consumers in the EU is not sufficient to outweigh these losses. Under the scenario based on the *Mercosur-proposal*, the direction of change is not altered, but the changes are more pronounced. Particularly, the increases in consumer welfare over-compensate for losses in the other components, leading to an overall positive welfare effect for the EU.

In Uruguay, the agricultural sector and the meat processing sector benefit from increased export opportunities and consequently higher prices for animals and meat of high quality, that outweigh the loss of the quota rent incurred by the slaughter houses. Consumer as adversely affected by higher consumer prices under both scenarios.

A similar pattern is repeated in Argentina, with the difference that here through increased trade, the tariff revenue from the export tariff levied on meat increases, and that the quota rent is not lost under the *EU-proposal*.

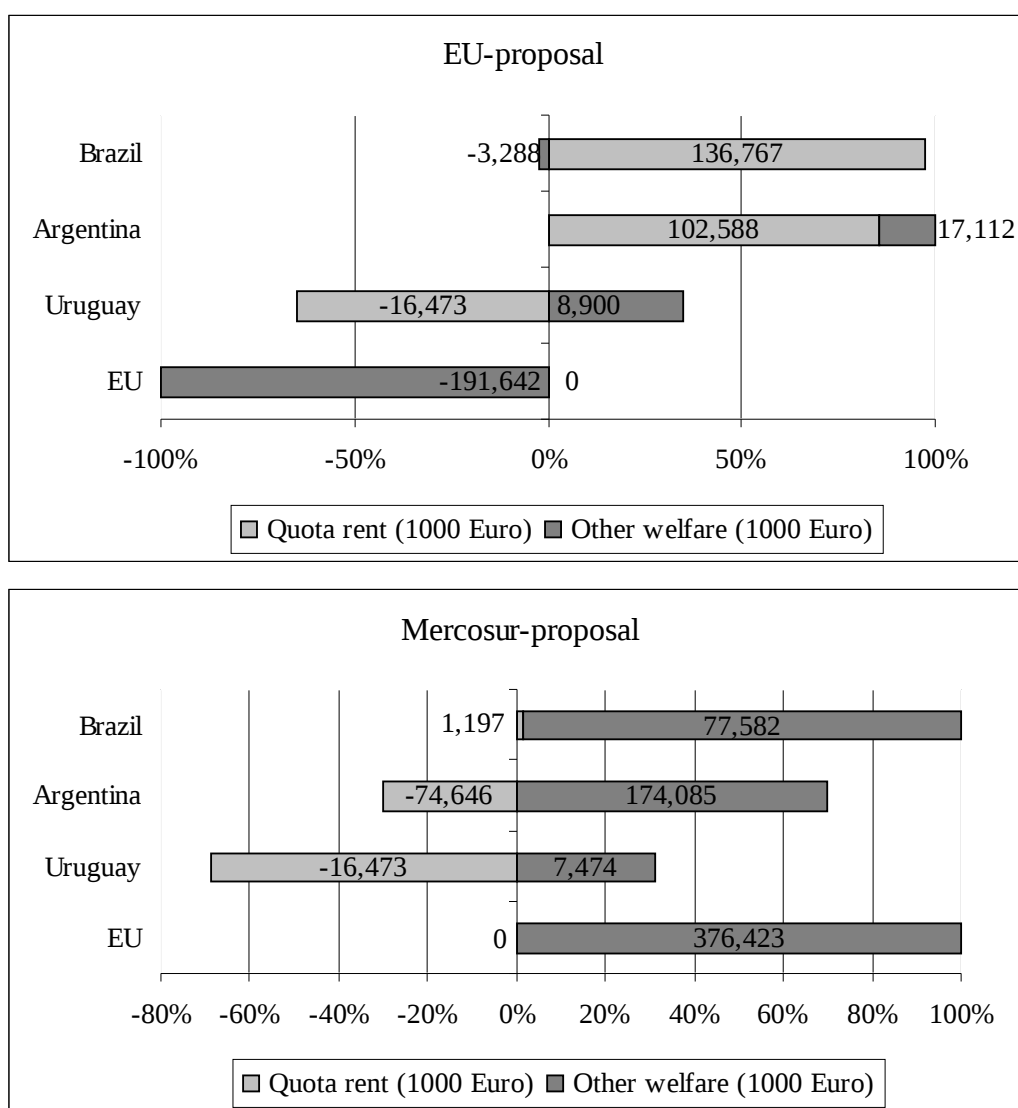
The Brazilian case is somewhat more complex. Cattle farmers experience a small loss of welfare in the simulations based on the *EU-proposal* since exports decrease slightly due to increased competition from Argentina. The meat processing sector on the other hand increases its welfare compared to the base situation by 1.5 percent, because the increase of the quota rent compensates for the losses accruing from reduced export opportunities. Consumers benefit from lower prices, but to a very limited extent. Under the *Mercosur-proposal*, the picture is changed. Farmers benefit from higher prices triggered by increased exports. So does the meat processing industry, but at the same time, the quota rent increases only modestly, and consumers' expenditure for meat increases. Taking these latter two effects together, trade liberalisation under the Mercosur-proposal is still welfare enhancing compared to the base situation, but slightly inferior to the impact under the EU proposal.

The role of the quota rents

Quota rents are a windfall profit generated from the specific trade policy instrument. As discussed earlier, their distribution can be decisive in the assessment of the welfare effects. In the case of the TRQs for high quality beef between the EU and the Mercosur countries, the quota rents remain fully in the exporting country, and there, with the exception of Argentina, entirely in the meat processing sector.

The changes of the quota rents and their share in total welfare effects are depicted in Figure 10. In the upper panel, the contribution of the changes in the quota rent as a share of the total welfare effects is depicted for the *EU-proposal*, in the lower panel, for the *Mercosur-proposal*.

Figure 10 Contribution of the quota rents to welfare changes



Source: Model results

Under the EU proposal, substantive shares of the total welfare effects can be attributed to changes in the quota rents arising from the high quality beef TRQs. Especially in the case of Brazil, where the quota is still over-filled under the *EU-proposal*, the quota rent is the determining factor for the sign of the overall welfare change. This is firmly grounded in the economic theory of TRQs, where expansion of an overfilled quota leads to the conversion of tariff revenue into quota rent. If this rent was captured by the importing country, i.e. the EU, liberalization according to the *EU-proposal* would result in welfare losses for Brazil.

In Argentina, despite accounting for roughly 85 percent of the total gains in welfare, the quota rent is not critical for the overall welfare effect. Even if the rent was captured by the importing side, the policy change would be advantageous for Argentina. Another interesting detail here is that despite the fact that the quota is binding now, the change in the quota rent is still positive, a result of both the in-quota tariff reduction and the intersection of the supply and demand curves.

Uruguay is a particular case: As the quota rent vanishes away under the provisions of the *EU-proposal*, Uruguay would have greater interest in this agreement if the quota rent was initially captured by the

importing country, and consequently the importer would be the party incurring the loss. The distribution of the rent is decisive for the direction of the total income change for Uruguay: While in the current setting, the welfare impact on national level is negative, it would be positive if the quota rent was initially captured (and consequently lost) by the importing party.

From the perspective of the EU, liberalization according to the *EU-proposal* would be welfare enhancing if the quota rents were captured by European importers.

The role of the quota rents is less marked in the scenario based on the *Mercosur-proposal*. For Brazil, the role of the quota rent is limited, thus an alternative distribution on international level would not change the picture for Brazil much. Argentina loses the entire quota rent, but the quota rent is not key to the overall national welfare effect either. Only for Uruguay, the quota rent determines the sign of the overall economic impact.

Conclusions

The main question in this paper was who gets the benefits when the EU liberalises Mercosur's access to the European beef markets. To answer this question, two different approaches were taken.

One was the construction of a partial equilibrium model that operates at a sufficiently low level of product to capture most of the complex EU-Mercosur trade relations. The model allows for welfare analysis of different stake holders involved in the business, and determines the quota rents as an endogenous variable.

To ascertain the distribution of these quota rents, the second approach taken was a consultation of stakeholders from the beef exporting and importing sectors.

Two policy scenarios were analysed. The main findings of the study are the following:

- The rents arising from the high quality beef TRQs allocated to individual Mercosur countries is fully captured by the exporting countries. The rents from the multilateral frozen are fully captured by EU importers.
- Within the Mercosur countries, the stakeholder assigned the right to export under the high quality TRQ obtains the rent. In Brazil and Uruguay, these are mainly companies in the meat processing and trading business. In Argentina, farmers obtain the rents arising from 7% of the exports under the preferential tariff.
- An agreement based on the *EU-proposal* would have only limited impact on trade flows. However, welfare is affected as a redistribution of tariff revenue to quota rents takes place. This implies a redistribution of income from the EU to the exporting countries, and leaves the EU with a negative welfare impact.
- An agreement based on the *Mercosur-proposal* would lead to de-facto free trade between the EU and, with the exception of Brazil, the Mercosur countries: The largely expanded quotas are no longer binding, and the in-quota tariff is zero.
- Under the *Mercosur-proposal*, all Mercosur countries covered in the analysis lose the quota rent that they captured in the initial policy setting. Nevertheless, improved trade opportunities outweigh these losses, so that the welfare change is positive even for the stakeholder that obtained the rent in the initial setting.

From a methodologic point of view, modelling bilateral trade through a very detailed commodity breakdown is technically feasible and renders plausible results. The number of variables and

parameters however is large, making calibration of the model to well-behaved parameters a rather challenging task for a model with a limited country and commodity space.

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