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Sanitary and Phytosanitary Measures and Tariff-Rate Quotas for U.S. Meat Exports to the European Union

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Abstract

Sanitary and phytosanitary (SPS) measures and tariff-rate quotas (TRQs) have been raised as key issues in recent negotiations on agricultural trade between the United States and the European Union (EU). Meats feature prominently in the discussions as they are heavily protected products, with both SPS measures and TRQs prevalent in beef, broiler, and pork trade. This study examines the current system of SPS measures and TRQs on U.S. meat exports to the EU and provides background on the market situation. The examination provides anecdotal evidence that both barriers have significantly limited the volume of U.S. exports, with the extent of these impacts varying across sectors. Qualitative assessment of hypothetical policy reforms suggests that potential gains for U.S. exports depend heavily on the interplay between the EU's SPS and TRQ regime and potential EU policy adjustments after implementation of the reforms.

Keywords: Beef, broiler, pork, nontariff measures, NTMs, sanitary and phytosanitary measures, SPS measures, tariff-rate quota, TRQs, Europe Union, Transatlantic Trade and Investment Partnership, TTIP

Contents

Introduction.....	1
Background.....	3
Meat Trade Barriers and Scenarios.....	4
Beef.....	4
Broiler meat.....	11
Pork.....	16
Conclusion.....	20
References.....	22

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Introduction

Collectively, the United States and the European Union (EU) account for nearly a third of global production and consumption of beef, broiler meat, and pork (table 1) (FAS, 2014c). Despite the two regions being the world's top consumers of these meat products, imports account for only a small share of their total consumption, and bilateral trade in meat products between the United States and the EU is small. Several factors have limited U.S. meat exports to the EU, including sanitary and phytosanitary (SPS) measures and tariff-rate quotas (TRQs) (see box “NTMs, SPS Measures, and TRQs”).¹ This study provides a qualitative assessment of the effects of these trade barriers on U.S. exports of beef, broiler meat, and pork to the EU.² For SPS measures, the analysis focuses on the effects of EU bans on hormones used in beef production, chlorine wash used in broiler production, and ractopamine used in pork production.

In several recently concluded or ongoing trade negotiations, including the Transatlantic Trade and Investment Partnership (TTIP), SPS measures and TRQs in agriculture feature prominently. This study examines several hypothetical cases arising from different uses of these measures to improve market access for U.S. meat exports to the EU. The first case considered is an increase in TRQ

Table 1

EU and U.S. production, supply, and demand for selected meats, 2013

	EU		United States	
	Volume (1,000 MT)	Share of world total Percent ¹	Volume (1,000 MT)	Share of world total Percent ¹
Beef:				
Production	7,470	12.74	11,757	20.06
Imports	376	5.07	1,021	13.75
Exports	244	2.66	1,172	12.79
Consumption	7,602	13.38	11,617	20.44
Broiler:				
Production	9,800	11.66	16,976	20.19
Imports	671	7.75	55	0.64
Exports	1,083	10.58	3,340	32.63
Consumption	9,388	11.37	13,683	16.58
Pork:				
Production	22,390	20.46	10,530	9.62
Imports	15	0.23	399	5.99
Exports	2,232	31.80	2,264	32.26
Consumption	20,173	18.49	8,668	7.95

MT = metric tons.

¹Percentage is based on USDA-derived world total of key producing and consuming countries.

Source: USDA, Economic Research Service using data from USDA, Foreign Agriculture Service, Production, Supply, and Distribution database.

¹This study does not examine differences in competitive factors and consumer preferences between the United States and the EU; however, these should be considered in any future detailed economic analysis.

²The focus of this analysis is EU measures imposed on U.S. exports. For information on trade barriers imposed by other countries on EU exports, see http://madb.europa.eu/madb/sps_crossTables.htm

NTMs, SPS Measures, and TRQs

According to the United Nations Multi-Agency Support Team (MAST), nontariff measures (NTMs) are defined as policy measures other than tariffs that may have an economic effect on international trade (UNCTAD, 2010). NTMs may be categorized as technical or nontechnical measures. Technical measures include sanitary and phytosanitary (SPS) measures, technical barriers to trade (e.g., product standards, testing requirements, and other technical requirements), pre-shipment formalities, and related requirements. Nontechnical measures include quotas, price control measures, rules of origin requirements, government procurement restrictions, and related measures.

SPS measures include standards necessary to protect human, animal, or plant life or health from risks arising from the entry or spread of plant or animal-borne pests or diseases, or from additives, contaminants, toxins, or disease-causing organisms in foods, beverages, or feedstuffs (Womach, 2005). Under the World Trade Organization's (WTO) SPS Agreement, countries are allowed to impose standards that are based on science, are implemented with adequate risk assessment, and do not discriminate against foreign producers. While SPS measures are intended to address food, animal or plant safety issues, their requirements may restrict trade by adding compliance, inspection, and operational costs. In some cases, the costs are prohibitive and prevent trade altogether. Exporters have raised concerns over SPS measures that have requirements disproportionate to the actual levels of risk, or measures viewed as disguised barriers to trade (Anderson et al., 2012). Foreign meat products face a range of technical and nontechnical NTMs in the EU market, including SPS measures, which are a focus of this report.

TRQs are a special type of quota that implements a two-tiered tariff, charging one tariff rate on a set amount of imports (i.e., the quota portion) and a second tariff on above-quota amounts. Because many in-quota tariffs are relatively low and above-quota tariff rates are prohibitively high, TRQs often operate like a simple quota. Countries use a variety of methods to administer TRQs that can further inhibit market access. These range from auctions to licenses on demand to first-come, first-served fulfillment of quotas (IATRC, 2001).

allocations, with SPS measures remaining unchanged. Similar measures were initiated in recently signed EU free trade agreements (FTAs), such as those with Chile or South Africa. In this case, expansion of U.S. exports depends on the ability of U.S. exporters to supply meat in compliance with SPS standards. The second case examines the removal of SPS measures, without an increase in the TRQ. The effect of removing an SPS measure depends on the current fill rate of the quota and may be constrained by the over-quota tariff rate. This outcome also depends on potential demand response from EU consumers to the availability of products of a different standard. The final case examines the removal of both TRQs and SPS measures.

The analysis also points to the potential policy reverberations of removing these trade barriers. SPS measures in the meat sector dictate much of the EU's overall agricultural trade policy. As their reform carries significant consequences for trade, additional policy adjustments may also be implemented following their reform. For example, if the EU removes an SPS measure, will the current TRQ regime be maintained? Could other nontariff measures (NTMs) be implemented in their place? The role of further policy adjustments are thus an important consideration for assessing the economic implications of reforming SPS measures.

Background

In the proposed TTIP agreement, SPS measures and TRQs are two key market access issues for agricultural trade (see box “Literature Estimates of NTM Removal Impacts”). In general, both the EU and the United States have low tariffs on goods. The EU, however, has higher tariffs on agricultural products. For agriculture, the trade-weighted tariffs are estimated to be 8.6 percent for EU imports from the United States and 2.1 percent for U.S. imports from the EU (Akhtar and Jones, 2013). In addition to imposing higher tariffs, the EU has been more selective in including agricultural products in FTA negotiations, while the United States has been more comprehensive in its level of liberalization in FTAs (Grueff, 2013).

Literature Estimates of NTM Removal Impacts

A few studies have estimated the economic impacts of removing nontariff measures (NTMs), such as sanitary and phytosanitary measures, most often by using computable general equilibrium (CGE) models. Most recently, the proposed Transatlantic Trade and Investment Partnership (TTIP) negotiations have featured prominently in this research. ECOYRS (2009) used a CGE model to quantify the potential effects of NTM removal on all U.S.-EU trade, including both agricultural and nonagricultural trade. In the study’s ambitious scenario, 50 percent of NTMs were eliminated; in addition, regulatory divergences (differences in regulations used by the United States and the EU) were eliminated. Model results suggest that the effects of this scenario could push EU gross domestic product (GDP) 0.7 percent higher by 2018, which represents a potential annual gain of \$158 billion. For the United States, GDP would increase by 0.3 percent per year beginning in 2018, which represents a potential annual gain of \$53 billion. Unfortunately, specific results were not estimated for agricultural sectors, although the report’s annexes (appendices) provide a detailed assessment of NTMs faced by the EU and United States.

A study by CEPR (2013), again covering all trade between the United States and the EU, used the NTM calculations from ECOYRS (2009) but considered more model-based scenarios. The most ambitious scenario¹ predicted potential economic gains of \$155 billion a year for the EU and \$124 billion a year for the United States. The model used by CEPR (2013) estimated results for the agricultural sector as a whole but not by commodity subsector.² Agricultural exports and imports for both the United States and the EU are expected to increase under each of the scenarios in CEPR (2013), with U.S. exports to the EU increasing by more than EU exports to the United States. The results also suggest that reducing NTMs could account for as much as 80 percent of the potential economic gains from the TTIP.

¹This scenario considers 100 percent removal of tariffs, 25 percent removal of NTMs for goods and services, and 50 percent removal of procurement NTMs.

²Fisheries and forestry activities were also included with agriculture.

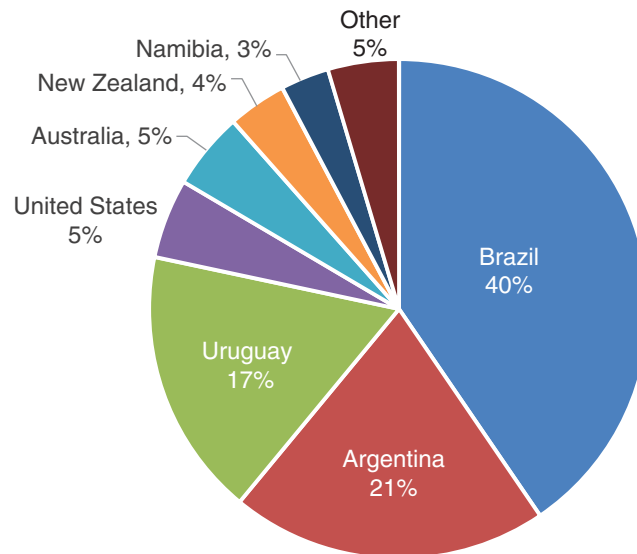
Meat Trade Barriers and Scenarios

Several agricultural commodities exported from the United States to the EU face barriers from SPS measures or TRQs. For example, exports of genetically modified organisms and crops sprayed with certain chemicals face SPS measures, and more than half of wheat, tree nut, and dairy product exports are subject to TRQs. For SPS measures, this analysis focuses on the effects of EU bans on hormones used in beef production, chlorine wash used in broiler production, and ractopamine used in pork production.³ Although other SPS measures affect U.S. meat trade, these three restrictions are viewed as the primary impediments for U.S. meat exporters and feature prominently in recent and ongoing trade discussions (Inside U.S. Trade, 2014).

Beef

The EU is one of the largest beef-producing and beef-consuming regions, ranking third by both measures after the United States and Brazil. In 2013, beef production and beef consumption in the EU totaled 7.5 million metric tons and 7.6 million metric tons, respectively (FAS, 2014c). The EU has historically been self-sufficient in beef, producing slightly above or below consumption, but production has declined over the past 20 years since peaking in 1991 (FAO, 2014). EU beef imports averaged 5 percent of consumption in recent years, compared with 9 percent for the United States (FAS, 2014c). The majority of EU beef imports have come from South America, with Argentina, Brazil, and Uruguay accounting for a combined 78 percent between 2009 and 2013 (fig. 1). The United States was the fourth largest source for EU beef imports during this period. In general, beef imported from the United States is higher value, grain-fed product, while a large share

Figure 1
Source of EU beef imports, 2009-13 average



Note: Amounts reflect shares of total volume imported.
Source: USDA, Economic Research Service using data from Global Trade Atlas, 2014.

³Although these measures discussed can be considered sanitary, rather than phytosanitary, we keep the “SPS” nomenclature as this term is commonly used throughout the field. Phytosanitary measures relate to plant health and safety.

of beef imported from South America is prepared-product (e.g., corned beef and manufacturing-grade product used in ground beef production). The average unit price of U.S. beef imported by the EU was \$5.02 per pound in 2013, compared with \$3.14 per pound for beef imported from Brazil (Global Trade Atlas, 2014).

Beef produced in or exported to the EU is subject to different SPS standards than beef produced and consumed in the United States. Hormone growth promotants were banned by the EU in 1989 in response to growing public concern over their effect on human health (Johnson and Hanrahan, 2010). Other production technologies have also been banned by the EU (see box “Production Technologies Used in U.S. Beef Production”). The hormone ban, in particular, caused a decline in U.S. beef exports to the EU. Between 1980 and 1988, U.S. beef exports to the EU averaged 4,400 metric tons of beef muscle cuts and 68,000 metric tons of beef variety meats (offal) per year. U.S. exports of variety meats (e.g., beef tongues and livers) to the EU fell 86 percent and exports of beef muscle cuts fell 59 percent the year after the hormone ban took effect (FAS, 2014b). Having no nonhormone production certification program in place, the United States virtually lost its access to the EU beef market after the hormone ban was implemented.

EU beef imports from the United States were negligible during the 1990s in the midst of a WTO dispute between the two countries (see box “WTO Disputes”). To facilitate trade between the United States and EU, USDA’s Agricultural Marketing Service (AMS) began operating the Non-Hormone Treated Cattle (NHTC) Program in 1999. The NHTC program certifies U.S. beef for export to the EU by ensuring cattle are not treated with hormones. All producers—farm, feedlot, and rancher—must be certified by AMS to participate in NHTC. Certification requires producers to document adherence to all program requirements and participate in an on-site visit by AMS to inspect herds, check documentation, and examine feed sources. Producers pay for initial site visits and subsequent compliance audits.

USDA’s Food Safety and Inspection Service (FSIS) certifies slaughterhouses and packing plants that process beef for export to the EU. Packers may incur costs for plant modifications needed to meet EU requirements, such as constructing separate facilities to prevent comingling of nonhormone and other cattle. FSIS also coordinates residue testing of approved plants in accordance with the EU’s Additional Residue Testing Program. Under the rules of the program, randomly selected slaughter facilities must provide muscle cut and urine samples of certified cattle for residue testing (FSIS, 2014a). A private lab approved by the EU tests for growth promotant hormones, beta-agonists (including ractopamine), and steroids.

U.S. beef exports to the EU have grown along with participation in the NHTC program. Further growth in exports, however, is limited by TRQ levels. Between 1997 and 2009, the high-quality beef (HQB) quota, or Hilton quota, provided shared access of 11,500 metric tons per year for U.S. and Canadian beef at a 20-percent ad valorem tariff rate. Imports above quota are subject to a steeper tariff: an ad valorem tariff of 12.8 percent plus a specific tariff of \$1,838 to \$3,944 per metric ton, depending on the cut (table 2).

In 2009, the United States and the EU signed a memorandum of understanding (MOU) that allowed increased access for high-quality and hormone-free U.S. beef. Under the terms of the MOU, the United States agreed to eliminate the retaliatory tariffs placed on a list of primarily agricultural EU products stemming from the WTO dispute while the EU created a new TRQ for U.S. beef. Initial access to the EU market was for an additional 20,000 metric tons of U.S. beef at zero duty, with further access granted for future years. In 2012, the EU revised the HQB quota to provide additional

Production Technologies Used in U.S. Beef Production

A number of pharmaceutical technologies have been approved as safe for use in U.S. beef production. Growth promotant hormones have been used in the United States since the 1950s and are also approved for use in Australia, Canada, and New Zealand.¹ They are typically administered to cattle via pellet-sized ear implants that emit small amounts of either a single or a combination of hormones. Hormone use is widespread in U.S. beef production, especially among grain-fed cattle. Of cattle in feedlots with over 1,000-head capacity, 84 percent were implanted with hormones in 2011 (APHIS, 2013).

Hormone treatment affects cattle production by increasing muscle growth and decreasing fat deposition in the carcass. Lawrence and Ibarburu (2007) examined the effect of implanted hormones and other production technologies on feed efficiency and average daily weight gain for U.S. cattle in feedlots. A hormone implant was found to increase average daily gain by 14.1 percent and improve feed efficiency by 8.8 percent (box table). The authors also calculated the cost of removing production technologies. Removing implanted hormones would increase costs by \$68.59 per head, implying that hormone treatment provided the largest production cost savings of all of the technologies studied.

Beta-agonists, such as ractopamine, are used to increase the rate of weight gain without additional feed intake. They were first approved for use in U.S. livestock in 1999 and were banned by the EU in 2006. In 2011, 57 percent of cattle in U.S. feedlots were administered one of the two commercially available beta-agonists approved for use (APHIS, 2013). Beta-agonists were found to improve average daily gain by 14.0 percent and feed efficiency by 12.6 percent in the Lawrence and Ibarburu analysis. Beta-agonists reduce production costs by the second largest amount after implanted hormones, \$13.02 per head. Although the beta-agonist effect on average daily gain and feed efficiency is similar to that of implanted hormones, the effect on cost savings is less because beta-agonists are administered for a shorter period of time than are hormones.

Antibiotics have been used in U.S. beef production nearly as long as hormone implants. Although antibiotics were initially administered to cattle for therapeutic reasons, producers realized that small amounts of antibiotics increased feed efficiency and average daily gain by improving the animals' digestion, metabolism, and general health (Elam and Preston, 2004). Ionophores, a feed additive, have been used since the 1970s and also improve feed efficiency and average daily weight gain (Elam and Preston, 2004).

Effect of pharmaceutical technologies on average daily gain and feed efficiency

Production technology	Share of cattle on feed	Improvement in avg. daily gain	Improvement in feed efficiency	Cost savings per head
		-----Percent-----		Dollars
Implanted hormones	84.4	14.1	-8.8	68.59
Beta-agonists	57.4	14.0	-12.6	13.02
Ionophores	89.9	2.9	-3.6	12.43
Injectable antibiotics	26.0	3.4	-2.7	5.86
				99.90

Note: Feed efficiency is the ratio of pounds of feed to pounds of weight gain; therefore, a negative ratio implies less feed is required to achieve the same weight gain.

Source: USDA, Economic Research Service using USDA, Animal and Plant Health Inspection Service (for percentages of cattle on feed) and Lawrence and Ibarburu, 2007 (for all other data).

¹As Webster (1989) points out, there is no complete hormone-free beef as hormones occur naturally in cattle and all other animals. By "hormone-free" we are referring to beef production with the use of supplemental hormones.

access up to 48,200 metric tons for grain-fed beef. Over time, additional countries have gained access to this quota which is now shared by six countries: Argentina (added in 2014), Australia (2010), Canada (2010), New Zealand (2011), the United States (2009), and Uruguay (2011).

WTO Disputes

In 1989, in response to the import ban on beef from hormone-treated cattle imposed by the EU, the United States (and Canada) retaliated by applying 100 percent ad valorem tariffs on EU agricultural products (Johnson and Hanrahan, 2010). The tariffs, valued at \$93 million per year, remained in place until 1996. At that time, the United States requested and was awarded a favorable verdict in a World Trade Organization (WTO) dispute settlement panel case against the EU. A subsequent Appellate Body confirmed that the EU ban violated a provision of the WTO's SPS Agreement as it was viewed as not being based on scientific principles. The EU neglected to implement the WTO dispute settlement body's recommendation; therefore, the United States and Canada were granted permission by the WTO in 1999 to apply retaliatory tariffs. Ad valorem tariffs of 100 percent were again levied on imports of a list of primarily agricultural EU products, with the values of the tariffs representing the damage that the hormone ban caused to beef sales to the EU: \$116.8 million for the United States and C\$11.3 million for Canada.

In addition to the beef case, the United States filed a WTO case against the EU in 2009 challenging the restrictions placed on U.S. broiler exports due to a ban on pathogen reduction treatments (PRT). The United States Trade Representative argued that the ban on PRTs was a protectionist measure and insisted that the use of PRTs had been deemed safe. PRTs have been approved by USDA and the FDA. In addition, scientists from the European Food Safety Authority found that the use of PRTs is safe and effective. While a panel was formed in November 2009, there has been no formal resolution of the case through the WTO.

Table 2

U.S. access to EU tariff-rate quotas for beef

High-quality beef quota	TRQ (metric tons per year)	Tariff rate ¹ (percent)
Initial access (1997-present)	11,500 ²	In-quota 20
		Above-quota 12.8 (plus tariff \$1,838-\$3,944/mt)
EU/U.S. MOU (2009-12)	20,000 ³	In-quota 0
		Above-quota 12.8 (plus tariff \$1,838-\$3,944/mt)
Current access (2013-present)	48,200 ⁴	In-quota 0
		Above-quota 12.8 (plus tariff \$1,838-\$3,944/mt)

MOU = memorandum of understanding.

¹Tariff rates converted from euros to U.S. dollars at a rate of \$1.30 to 1€.

²Access shared by United States and Canada.

³Access allowed for United States.

⁴Access shared by Australia, Canada, New Zealand, United States and Uruguay. Argentina given access beginning October 2014.

Source: USDA, Economic Research Service using data from European Commission Taxation and Customs Union, 2014.

In both TRQ expansions, no changes were made to the above-quota tariff rates. In 2013, the fill rate for the HQB quota was over 80 percent (EC Taxation and Customs Union, 2014); in 2014, the first quarter of the quota (ending September 30, 2014) approached the fill ceiling. With Argentina recently given authorization to use the grain-fed HQB quota, competition for quota use is expected to grow (Schuele, 2014). Although TRQ access has risen during the last few years, it remains small in proportion to total EU consumption.

Possible Outcomes

Several recent events may indicate a willingness by both parties to resolve the longstanding dispute over U.S. beef market access to the EU. In its Final Report released in February 2013, the EU-U.S. High Level Working Group⁴ stressed the importance of SPS issues and recommended that SPS requirements be brought in line with scientific assessment and international standards. Also in February 2013, the EU reversed its ban on imports of U.S. beef treated with lactic acid, which is used in slaughterhouses as a pathogen-reduction treatment. The United States has also reciprocated by announcing in November 2013 that it would once again accept beef imports from the EU, reversing a ban that had been in place since 1998 due to concerns over outbreaks of bovine spongiform encephalopathy (BSE) in cattle in the United Kingdom (UK).⁵

TRQ Reform Only. The first possible scenario—expansion of existing TRQs—may align with conditions set for Canadian beef market access in the proposed EU-Canada FTA. That is, the EU has proposed an additional and exclusive access of 50,000 metric tons per year, but with the hormone ban remaining in place. An increase in the TRQ for U.S. exporters could lead to higher EU imports of U.S. beef if U.S. producers respond with a rise in NHTC beef production and EU consumers respond with an equivalent rise in demand for U.S. beef. Since 2002, the EU has required country-of-origin labeling for beef. The labels specify the country in which an animal was born, raised, and slaughtered and enable consumers to differentiate between imported and domestic products. More recently, the EU adopted labeling requirements for other types of meat and dairy products that will take effect in 2015 (FAS, 2014a). Country-of-origin labeling was also expanded to include products that use meat as an ingredient, such as prepackaged foods. Given this trend, it is likely that the EU will continue to expand labeling requirements in the future.

Several studies have used surveys and choice experiments to determine consumer willingness to pay for several attributes in beef, including country of origin. Tonsor and Shroeder (2003) calculated the willingness of UK, German, and French consumers to pay premiums for USDA choice hormone-free beef versus an equivalent domestic steak. While consumers in France overwhelmingly preferred domestic source-verified beef, consumers in the UK and Germany preferred U.S. beef and were willing to pay a premium of \$3.25 and \$8.75 per pound, respectively. However, the survey used in Tonsor and Shroeder was conducted prior to the discovery of BSE in the United States. Product differentiation between U.S. and European meat is also a factor. U.S. beef is known for its high-quality flavor and marbling (intramuscular fat) and is generally found in high-end restaurants, gourmet shops, and luxury hotels and currently sells for a premium in the EU market (FAS, 2012).

⁴The High Level Working Group was established by the Transatlantic Economic Council on direction from the leaders of the EU and the United States to identify policies and measures to increase EU-U.S. trade and investment.

⁵BSE, or mad cow disease, is a fatal neurological disease affecting adult cattle that may be transmitted to humans under its variant form Creutzfeldt-Jakob disease through consumption of BSE-infected beef.

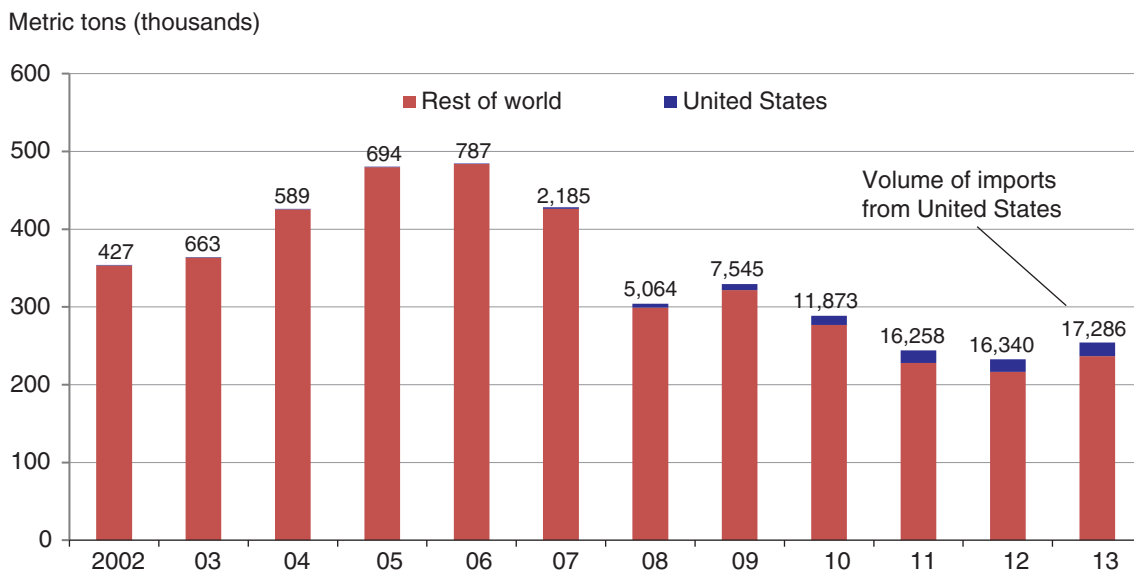
Historically, U.S. exporters have responded to increasing TRQ allocations. After the EU opened a new TRQ for U.S. beef in 2009, EU imports of U.S. beef rose 57.40 percent in 2010 and an additional 37 percent in 2011 (fig. 2). Increases in imports of U.S. beef occurred at a time when EU beef imports declined as a whole. While higher U.S. exports under this scenario are dependent on a growing supply of hormone-free U.S. beef, producers have shown a willingness to respond to higher TRQs and participation in NHTC has risen along with growth in exports to the EU.

An expansion in TRQs may also enable U.S. producers to lower production costs for nonhormone beef by capturing greater economies of scale. As described earlier, the NHTC program imposes significant fixed costs: producers must set up separate production lines and comply with inspection and certification requirements. These costs are likely to require significant scale of production for producers to recoup their investments. Because TRQs cap the amount of beef that can be sold with an NHTC premium, entrance into the NHTC program has been slow and gradual. Expansion of the quota may encourage further participation that could lower operational costs through improvements in economies of scale, further increasing the gains from reforming the TRQ regime.

A scenario that has not been considered is a reduction or elimination in above-quota tariff rates. Under previously enacted FTAs, such as the EU-South Korea Free Trade Agreement, the EU has generally lowered tariff rates only for countries that are not notable beef exporters (South Korea is a major net importer of beef) (FAS, 2014c). Turkey also had its above-quota tariff rate reduced through its free-trade deal with the EU, but the country is only a marginal exporter of beef. Canada, a significant beef producer and exporter, has yet to receive any above-quota tariff reductions in its potential trade agreement with the EU.

Hormone Ban Reform Only. In the second scenario examined, the full scope of U.S. production would be eligible for export to the EU, but TRQs could still limit expansion. The current TRQ for U.S. beef was allocated as a result of the beef hormone dispute and therefore could be modified if

Figure 2
EU beef imports from the United States and rest of world



Source: USDA, Economic Research Service using data from Global Trade Atlas, 2014.

the hormone ban is repealed. On the other hand, the United States could gain access to two other EU TRQs of 53,000 metric tons for frozen beef and 63,703 metric tons for frozen processing beef, both of which vastly exceed recent annual U.S. exports to the EU. However, EU consumers would need to accept hormone-treated beef and U.S. exporters would need to be willing to export lower valued frozen product. While the United States can likely compete well on higher valued chilled beef, it is less clear whether frozen U.S. beef (e.g., processing beef) could compete with lower priced product from South America and Australia (Deblitz and Dhuyvetter, 2013). Depending on the degree to which U.S. beef is cost competitive to EU beef, another possibility for increased access to the EU market is above-quota imports. The cost of producing conventional beef is lower in the United States than in the EU, in part due to cost-saving cattle management practices like hormones. Deblitz and Dhuyvetter (2013) estimated that U.S. costs were approximately \$26 to \$52 less per head than EU production costs, even when accounting for the costs to ship the beef to the EU. In 2013, Brazil exported a substantial quantity of beef to the EU that was above the TRQ allocation, suggesting that the Brazilian product (which faced a higher tariff rate) was price competitive with EU domestic product. Thus, it is possible that the United States could export beef above quota if the price of U.S. beef is sufficiently lower than the EU domestic price.

An important caveat of this scenario is the potential for policy counter adjustments following the removal of the SPS measure. The second scenario assumes that if the EU removes the beef hormone ban, all other policies will remain unchanged. However, the change in the SPS regime may lead to changes in other policies, particularly the current TRQ regime. The EU granted the quota as a concession for maintaining a ban on beef hormones in lieu of the U.S. victory in the WTO dispute. Thus, it is possible that the EU may not honor the TRQ for hormone-treated beef or may even retract the quota altogether. Second, the granting of market access for hormone-treated beef could also lead the EU to impose other NTMs. For example, current EU labelling policy only requires labels to specify a product's country of origin. Granting access to hormone-treated beef could prompt the EU to strengthen the policy to require labels to also include a description of applied production methods. Such policy counter adjustments could affect the overall gains from removing the beef hormone ban.

TRQ and Hormone Ban Reform. Depending on the magnitude of the change in TRQs, the third possible scenario could dramatically increase the supply of U.S. beef that could be exported to the EU. However, in this case, the increase in exports depends on EU consumer demand for U.S. hormone-treated beef. It is difficult to speculate the extent to which demand exists because hormone-treated beef is currently not sold in the EU. Therefore, available studies have relied primarily on responses from stated preferences.

Lusk et al. (2003) studied consumer preferences for hormone-free beef in the United States, the UK, Germany, and France. Survey results from the study show that EU consumers had higher levels of concern about the use of hormones in livestock production than their U.S. counterparts. On a scale of 1 (not at all concerned) to 5 (very concerned), average levels of concern in the four countries were 3.81 (United States), 4.20 (UK), 4.53 (Germany), and 4.54 (France). Consumers in France were willing to pay the highest premium (\$9.94 per pound) for hormone-free beef, which is not surprising considering that French consumers also had the highest average level of concern about hormones. Despite having a lower average level of concern, U.S. consumers were willing to pay a premium for hormone-free beef (\$7.39) similar to that of consumers in Germany (\$8.12) and the UK (\$7.29). Tonsor and Schroeder (2003) found considerably lower estimates of

consumer willingness to pay for hormone-free beef—\$0.93 per pound for consumers in France, Germany, and the UK.⁶

Studies that have focused on demand for hormone-treated beef have been limited to consumers in Western Europe. Preferences revealed in these studies would not necessarily extend to consumers in other EU countries. Sixteen countries have been added to the EU since 1986, none of which restricted hormone use in livestock production before EU admittance. Incomes tend to be lower in these countries, which may increase preference for lower priced beef regardless of production technique. Even among Western EU states, preferences for hormone-free beef vary significantly. While French consumers put the highest premium on hormone-free beef, several studies found that UK consumers put lower premiums on the product, and the UK government has often supported lifting the hormone ban (Johnson and Hanrahan, 2010).

Broiler meat

The EU is one of the world's leading producers of broiler (young chicken) meat, as well as a major consumer, exporter, and importer. In 2013, the EU produced 9.80 million metric tons of broiler meat and consumed 9.39 million metric tons (FAS, 2014c). On a per capita basis, the EU's broiler meat consumption of 47.8 pounds in 2013 was lower than that of the United States (113.3 pounds) and Brazil (89.5 pounds) but higher than that of Japan (42.1 pounds). Growth in per capita consumption of broiler meat in the EU has been quite strong increasing 32 percent since 1990. Over the same period, pork consumption has remained level and beef consumption has declined (FAO, 2014). The EU also exported 1.08 million metric tons of broiler meat in 2013 and imported 670,000 metric tons. The vast majority of EU broiler meat imports in 2013 came from Brazil and Thailand (93 percent combined) (fig. 3). EU imports of broiler meat from the United States in 2013 amounted to only 388 metric tons, with most shipments going to the UK. Most of the broiler meat imported by the EU from Thailand is specified as prepared or preserved chicken meat, while that imported from Brazil includes relatively equal amounts of prepared and preserved chicken, salted or brined chicken meat, and frozen cuts of chicken meat. Ninety-eight percent of the EU's broiler meat imports fell within those three categories in 2013.

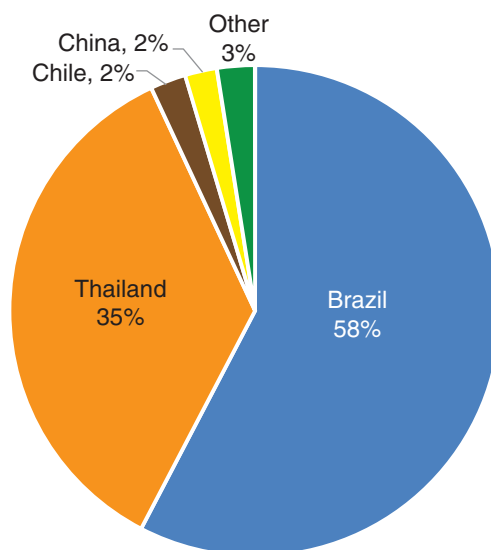
All broiler meat imported by the EU is required to be from sources that do not use pathogen reduction treatments (PRTs), such as chlorine wash, in their production (see box "Broiler PRTs"). PRTs are approved for use in the United States and are ubiquitous in U.S. domestic production. As a result of its restrictions, the EU imports very little broiler meat from the United States (fig. 4). The United States could, however, be competitive in the EU market because the 13 most recent EU member states imported significant volumes from the United States prior to their accession. The largest importer among the new member states was Romania, which joined the EU in 2007 and imported over 90,000 metric tons of broiler meat from the United States in 2005. Latvia, Estonia, Poland, and Bulgaria also imported large volumes of broiler meat prior to joining the EU.

Since the EU imports very little broiler meat from the United States, TRQs play a smaller role than they do for EU imports of U.S. beef. The United States receives an exclusive TRQ of 16,665 metric tons, which can be applied to fresh and frozen broiler and turkey meat in whole bird form as well as in parts (table 3). The TRQ does not include prepared and preserved chicken and salted

⁶The lower premium observed in this study is likely partially due to the surveying technique. Participants were given actual money and told that one of their choices would be binding, while the Lusk et al. (2003) survey was a questionnaire without any binding choice.

Figure 3

Source of EU broiler meat imports, 2013



Note: Amounts reflect shares of total volume imported.

Source: USDA, Economic Research Service using data from Global Trade Atlas, 2014.

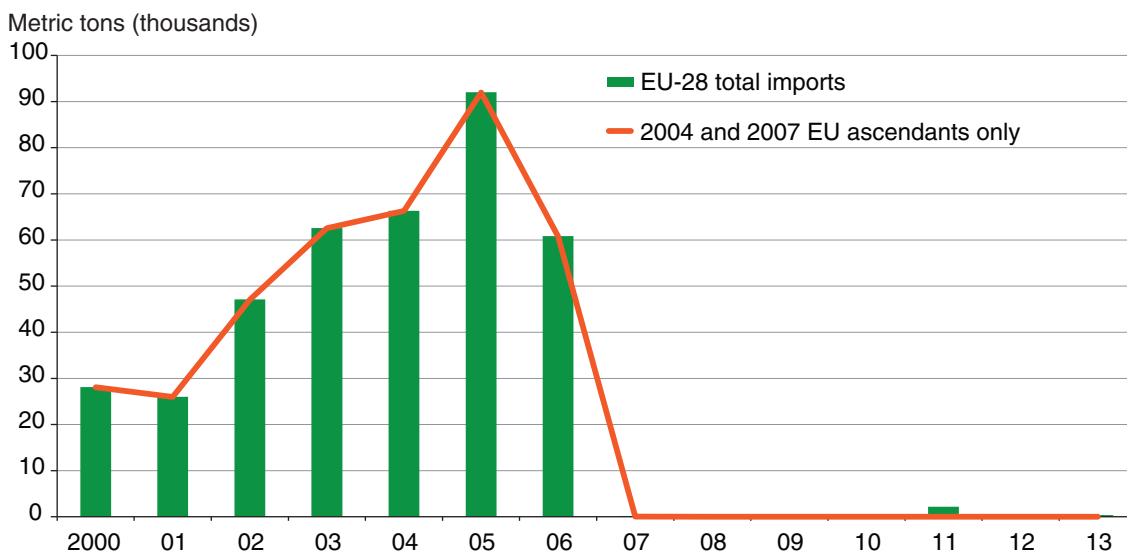
Broiler PRTs

Pathogen reduction treatments (PRTs) used in broiler production are antimicrobial treatments applied to broiler meat after slaughter in the final stages of processing. PRTs are commonly chlorine based, using chlorine dioxide or sodium chlorate, but they also can include trisodium phosphate or peroxyacids as their main ingredient. Most commonly, PRTs are applied as a wash or spray during final processing or are used in trace amounts when the meat is being chilled, usually in a chiller tank, to lower carcass temperature. According to FSIS (2014b), the amount of chlorine dioxide approved for use as a wash must not exceed 30mg/kg and when used in a chiller solution, only 50 to 150 parts per million of sodium chlorite may be present. The EU banned the use of PRTs in 1997 when it passed a regulation stating that “food business operators shall not use any substance other than potable water”—or, when otherwise permitted, “clean water—to remove surface contamination from products of animal origin,” unless use of another substance has specifically been approved by the EU. While not explicitly referring to PRTs, this regulation effectively barred use of the treatment for any animal product produced in or imported into the EU (Johnson, 2012).

Peroxyacids have been presented as a possible alternative to chlorine-based PRTs, with the perception being that the EU might be more likely to approve their use over chlorine-based PRTs. Peroxyacids, or peroxyacetic acids, are solutions that contain acetic acid and hydrogen peroxide along with some additional acids and are used in the same way chlorine-based PRTs are used. The European Food Safety Authority (EFSA) released a scientific opinion on the use of peroxyacetic acid solutions following a request by the European Commission. The request arose from an application dossier presented by USDA for the purpose of approval of peroxyacids as a PRT by food business operators. The March 2014 opinion found no safety concerns from the use of peroxyacetic acid solutions and noted their efficacy (EFSA, 2014). Previous opinions by the EFSA also found chlorine-based PRTs to be safe and effective.

Figure 4

EU broiler meat imports from the United States



Note: EU-28 total imports include trade from 13 member states that joined the EU in 2004, 2007, and 2013.
 Source: USDA, Economic Research Service using data from Global Trade Atlas, 2014.

or brined chicken meat, which makes up a large share of EU broiler imports from Brazil. The in-quota rate of duty varies for each of the 39 unique tariff codes listed within the TRQ, but each code provides a rate at least 20 percent below the above-quota rate. For example, frozen leg quarters (the United States’ largest broiler part for exports) are given an in-quota rate of \$232.70 per metric ton (assuming a currency conversion of €1 = \$1.3) as compared to \$465.40 per metric ton under the above-quota rates.

Brazil and Thailand receive large TRQs for key product categories, including prepared and processed as well as salted or brined chicken meat categories. Brazil and Thailand received these allocations after winning a WTO dispute that centered on specific product definitions under the European Commission’s combined nomenclature. Brazil and Thailand successfully argued that the EU had afforded the countries unfair treatment by reclassifying salted broiler products under the general frozen boneless cuts tariff line, leading to higher rates of duty (WTO, 2006).

As discussed previously, most EU broiler meat imports fall within three major categories: frozen parts and edible offal, cooked and/or prepared broiler meat, and salted or brined broiler meat. Regardless of the possible market access outcomes, the United States will likely have to be competitive with other countries in these categories if it seeks to increase broiler meat exports to the EU. The United States is a world leader in exports of frozen broiler parts, particularly leg quarters (fig. 5). Alternatively, salted or brined broiler meat is mostly exclusive to Brazil. Lastly, cooked and/or prepared broiler meat is dominated by Thai exporters, with Brazil and the United States holding a small share.

Based on recent trade, the United States has a demonstrated strength and competitiveness in the broiler parts sector: In 2013, it accounted for 41 percent of total global exports of broiler parts. Without restrictions related to PRTs or differences in TRQ allocations, the United States could emerge as a viable competitor to Brazil for the EU market. The United States has also demonstrated strength in the cooked or processed broiler meat category, accounting for 11 percent of global exports.

Table 3

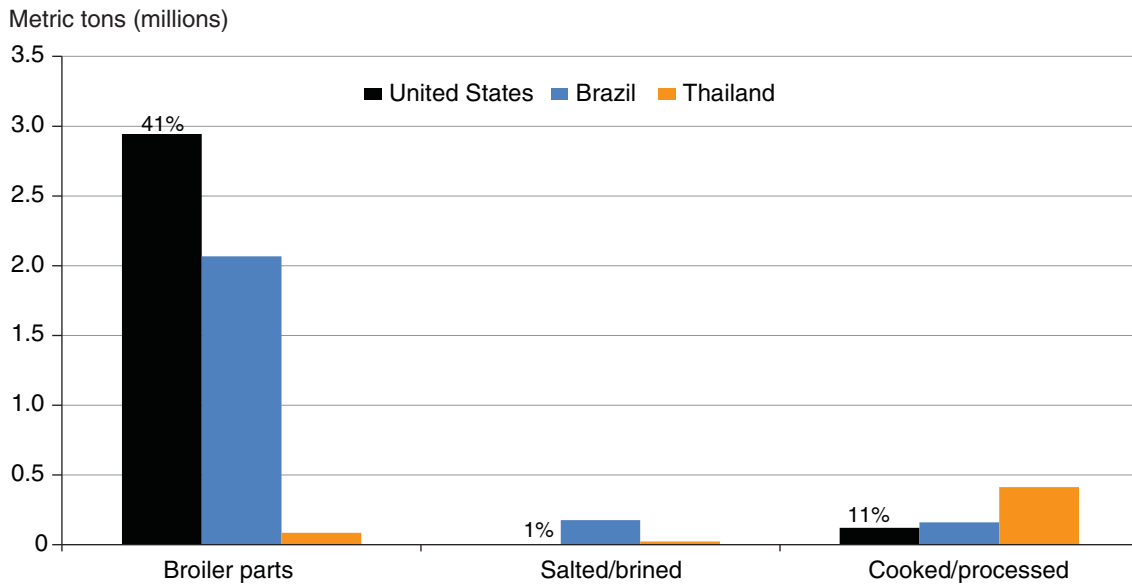
Current EU TRQs for different broiler products

Type of product imported	Allocated to:	Amount (MT)	In-quota rate (percent)
Broiler parts	U.S.	16,665	~20-50 MFN
	All countries	8,070	~20-50 below MFN
Boneless cuts	Brazil	9,600	0
	Thailand	5,100	0
	All countries	3,300	0
	All countries	2,305	~20 below MFN
Boneless cuts and breasts	Brazil	2,332	0
Cooked, prepared or preserved meat	Brazil	79,477	800
	Thailand	160,033	800
	All countries	11,443	800
Salted or brined meat	Brazil	170,807	1,540.00
	Thailand	92,610	1,540.00
	All countries	828	1,540.00

Note: For boneless cuts, there are two tariff-rate quota (TRQ) lines—the first with no in-quota rate and the second with an in-quota rate 20 percent below most favored nation (MFN) status.

Source: USDA, Economic Research Service using data from European Commission Taxation and Customs Union, 2014.

Figure 5

Global export volume of three key broiler categories, plus U.S. share (in percent), 2013

Source: USDA, Economic Research Service using data from Global Trade Atlas, 2014.

Possible Outcomes

TRQ Reform Only. Even with existing TRQs, the United States exports very little broiler meat to the EU due to the ban on PRTs. It is possible that U.S. producers could modify production practices to comply with the EU's PRT ban. Similar to the case of the NHTC program for beef, an expansion of the TRQ could provide incentives for the U.S. broiler industry to seek EU market share. However, since the ban was imposed in 1977, the industry has not attempted to adopt production practices that would conform to EU requirements, and it is unclear whether present negotiations would sufficiently alter economic incentives to change production practices.

PRT Reform Only. Most countries that have recently joined the EU imported U.S. broiler products prior to ascension. Romania imported an average of 42,000 metric tons per year between 2000 and 2006. As a whole, the 28 states that currently make up the EU imported an average of 55,000 metric tons in total during the period, with less than 50 metric tons going to countries that were already members of the EU. If SPS restrictions on U.S. broiler imports were lifted, it is plausible that these countries would resume imports from the United States. The amount of imports, however, would be sensitive to current TRQ allocations, likely leading to lower totals than during pre-ban years. Furthermore, as with beef, reforms could result in counter-policy adjustments (i.e., changes in TRQ allocations, labelling requirements, or introduction of other NTMs) that could lower potential U.S. gains in market share.

Imports from the longer standing EU member states are harder to predict, as EU import data are limited for years before 2000. The general understanding is that the United States was not a major supplier to the EU prior to the ban. Substantive demand studies relating to European consumers' preferences for U.S. broiler products do not exist, and it is difficult to speculate on U.S. broiler export gains from removal of the PRT ban. Still, the United States has demonstrated competitiveness with Brazil in the global broiler parts market (see fig. 5). Absent strong consumer preference differences and tariff rate differences between the United States and Brazil, it is not unreasonable to assume that, if the PRT ban were lifted, the United States could increase broiler parts trade with older EU member countries, as well. The amount of trade would still be dependent on current TRQ allocations.

PRT Reform with TRQ Reform. Given the previous discussion of TRQs, the amount by which the United States could potentially increase broiler meat exports in the absence of the PRT ban depends significantly on the TRQ regime and consumer demand. The United States has exclusive access to a TRQ for 16,665 metric tons per year, which can be allocated to any fresh or frozen broiler parts with a varying in-quota rate below the prevailing rate. The United States also has access to 8,070 metric tons per year of the same category but must compete with other countries on a first-come, first-served basis. In the case of boneless cuts, processed meat, or salted broiler meat, the United States and most countries are at a distinct disadvantage to Brazil and Thailand, who have received large TRQs at low rates of duty.

Increases in the size of the U.S. exclusive quota for broiler parts will allow for increases in U.S. broiler part exports. The larger issue, however, is whether the United States can gain similar access to the allocations granted to Brazil and Thailand for boneless cuts; breast meat; and cooked, prepared, or preserved broiler meat. For the United States to meet or exceed past trade levels with recent EU entrants like Romania, its TRQ allotments will likely have to reach 55,000 metric tons or more per year. The terms of the TRQ will also have to be sufficiently competitive with those of Brazil and Thailand. If increased U.S. trade with the longer standing EU countries is also to be considered, the TRQ allocations will have to increase further.

Pork

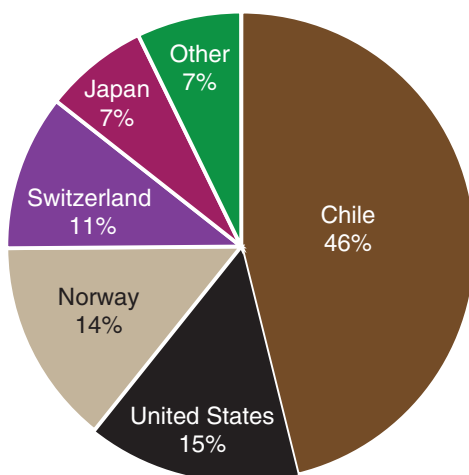
The EU is a large producer, consumer, and exporter of pork. Exports make up 10 percent of production, but EU pork imports are small. Most pork consumed in the EU is from domestic production, while less than 0.1 percent of total consumption is sourced from outside the region (FAS, 2014b). Chile, the United States, and Switzerland are the largest foreign suppliers of pork products to the EU (fig. 6). Even as the second largest supplier, the United States exported only 1,708 metric tons of pork to the EU in 2013, accounting for 15 percent of total EU pork imports but less than a hundredth of a percent of EU consumption.

The EU has a large domestic pork industry, and foreign producers seeking market access for their products face several layers of barriers. First, the EU levies high tariffs that vary between specific cuts of pork (EC, 2007). A TRQ is open to WTO members that allows for imports of pork of 70,390 metric tons per year at a tariff between \$325 and \$1,020 per metric ton (table 4). These rates are much lower than the above-quota rates. For example, boneless loins and hams have a rate of \$345 per metric ton in-quota and \$1,200 per metric ton above-quota. However, the in-quota tariff rate is still relatively high, and the quota fill rate was less than 12 percent in 2013.

Chile, the largest exporter to the EU, has a duty-free TRQ with an annually increasing quota as a result of an FTA (EC, 2003). In 2013, the EU imported 5,398 metric tons of pork from Chile, which fell below the duty-free allotment of 7,500 metric tons. In previous years, EU imports of pork from Chile filled or exceeded the annual TRQ allocation (fig. 7). Despite exceeding the TRQ in previous years, total EU imports of pork were historically lower than the 5-percent minimum market access target under the WTO.

U.S. pork market access to the EU is also limited by SPS barriers, notably the prohibition on ractopamine (see box “Pork SPS Measures”).

Figure 6
Source of EU pork imports, 2013



Note: Amounts reflect shares of total volume imported.
Source: USDA, Economic Research Service using data from Global Trade Atlas, 2014.

Table 4
EU TRQs for pork

Type	TRQ (metric tons per year)		Tariff rate ¹ (dollars)
WTO quotas	70,390 ²	In-quota	325-1,020/mt
		Out-of-quota	697-1,130/mt
Fresh/chilled loins and frozen bellies	7,000 ²	In-quota	0%
		Out-of-quota	697-1,130/mt
Boneless hams	4,722 ³	In-quota	325/mt
		Out-of-quota	1,130/mt

TRQ = tariff-rate quota. WTO = World Trade Organization. MT = metric tons.

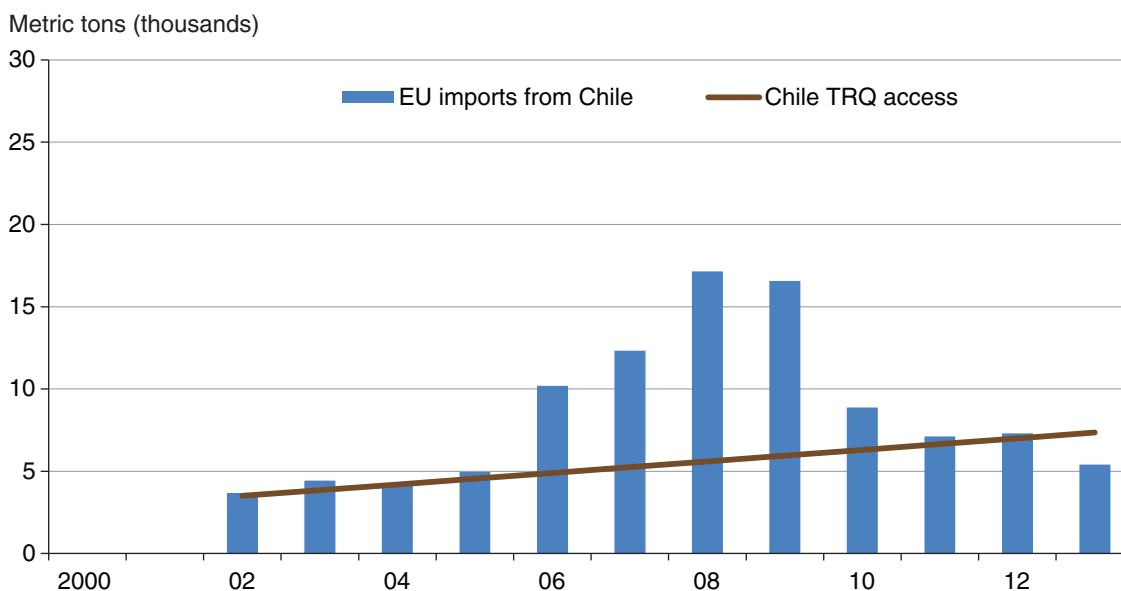
¹Tariff rates converted from euros to U.S. dollars at rates of \$1.30 to €1.

²Access allowed for all WTO members.

³Access allowed for United States.

Source: USDA, Economic Research Service using data from European Commission Taxation and Customs Union, 2014.

Figure 7
EU pork imports from Chile and Chile TRQ access



TRQ = tariff-rate quota.

Source: USDA, Economic Research Service using data from Global Trade Atlas, 2014.

Possible Outcomes

TRQ Reform Only. An increase in TRQs has precedence in EU FTAs, as evidenced by the region's agreement with Chile. The proposed Canada-EU free trade agreement is also expected to increase quota amounts for Canadian pork. If the United States receives similar or greater quota access as Chile, the question becomes whether the U.S. pork industry is able to adopt ractopamine-free production methods. As ractopamine is used extensively in the United States, procedures to prevent comingling of treated and untreated hogs will likely add additional production costs. However, unlike the stance of the U.S. broiler meat industry in its use of chlorine wash, the U.S. pork industry has shown a willingness to produce ractopamine-free pork for export. Production of ractopamine-

Pork SPS Measures

Ractopamine, a feed additive that improves hog feed efficiency, was approved in 1999 by the U.S. Food and Drug Administration for use in the United States. The Codex Alimentarius Commission, the United Nation's food standards body, also established minimum residue levels for ractopamine in 2012. Ractopamine has also been approved for use by 25 other countries, including Brazil, Canada, Japan, Mexico, and South Korea (Bachman, 2013; NPPC, 2013). However, pork produced using ractopamine is banned in the EU, China, Taiwan, and Russia. To export pork to the EU, U.S. exporters must participate in the Pork for the European Union (PFEU) program, which provides verification for ractopamine-free pork. Currently, only one facility (located in Canada) is approved by the EU to verify ractopamine-free pork. In addition to the ractopamine ban, U.S. pork exporters face several other nontariff measures that constrain access to the EU market. For example, trichinae testing is required for pork exports to the EU. Trichinae is a parasite that occurs in a small amount of U.S. pork (0.194 per million animals) and has been nearly eradicated in U.S. commercial pork production (CDC, 2009; NPCC, 2013).¹ The U.S. pork industry views trichinae testing to be disproportionate to the actual levels of risk: certification costs are estimated to be \$0.044 per pound (Hendricks, 2013), while the likelihood of being infected with trichinosis through consumption of U.S. commercial pork may be as low as 1 in 300 million (NPPC, 2013). The EU also prohibits the use pathogen-reduction treatments, which are used to remove contaminants from meat.

¹From 1947 to 1951, trichinae infections averaged 393 people per year, mostly stemming from pork consumption. However, advancements in biosecurity over the past 30 years have nearly eradicated trichinae in U.S. commercial pork production, and the majority of human infections today stems from wild game consumption (CDC, 2009).

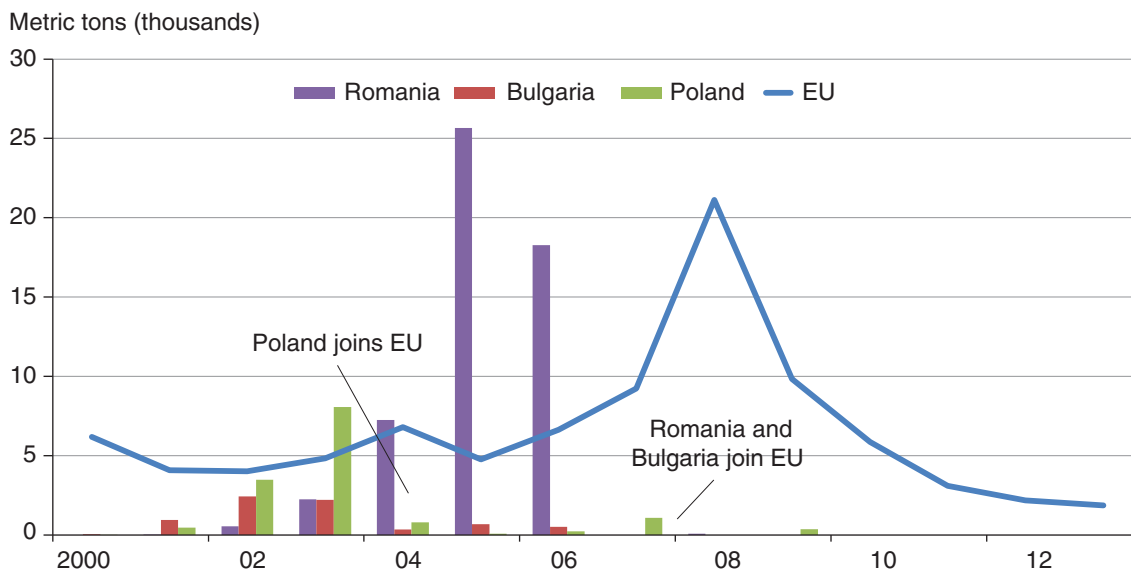
free pork is increasing as the industry adapts to other foreign markets with restrictions, such as China. Currently, the United States supplies small amounts of ractopamine-free pork to the EU, although far less than the volume of hormone-free beef. Smithfield, the largest U.S. pork producer, has recently shifted its production practices to begin producing more pork without ractopamine. According to Smithfield, in the interest of complying with regulations in China's market, 50 percent of the company's production will become ractopamine-free (Bottemiller, 2013). As in the beef and broiler meat export scenarios, an increase in TRQs could lead to economy-of-scale benefits from higher entry into ractopamine-free production.

Ractopamine Ban Reform Only. If the EU removes its ractopamine ban, U.S. pork producers would likely be able to increase production to facilitate an increase in U.S. pork exports. As better technology and larger farm sizes have increased productivity, U.S. hog production has increased by 16 percent since 2003 (Key and McBride, 2008). Much of the increase is attributed to export growth, which has increased 119 percent over the period. However, while increases in EU imports from the United States may be expected due to the supply response, the United States would remain at a distinct disadvantage to Chile and, potentially, Canada in the coming years without a significant restructuring of TRQs.

TRQ and Ractopamine Ban Reform. As discussed earlier, U.S. supplies are likely sufficient to meet an increase in EU demand. However, the level of EU demand for pork treated with ractopamine is uncertain. Unlike with hormone-treated beef, research has not been conducted on EU consumer demand for pork from hogs treated with ractopamine. However, historical imports of U.S. pork

by recently admitted EU member states Bulgaria, Croatia, and Romania suggests that demand for ractopamine-treated pork does exist. While other EU countries imported small amounts of U.S. pork over the past 10 years, the newer member countries imported significant quantities in the years prior to their accession (fig. 8). Romania imported over 40,000 metric tons of U.S. pork in the final 2 years prior to entry. Poland and Bulgaria also imported relatively large quantities. In the absence of ractopamine restrictions and prohibitive tariff rates, it is possible that imports from these countries may resume at or near previous levels. It is less clear how consumers in the older EU member countries might respond to changes in trade policy. At a minimum, however, producers should be able to match the gains in the first possible scenario by providing supplies of ractopamine-free pork.

Figure 8
EU, Poland, Romania, and Bulgaria pork imports from the United States



Source: USDA, Economic Research Service using data from Global Trade Atlas, 2014.

Conclusion

Protection in the EU meat market is multifaceted, with many trade barriers facing exporters. This study examined EU SPS measures and TRQs faced by U.S. beef, broiler meat, and pork exporters. These measures have limited U.S. meat exports and carry complex joint effects that challenge TTIP negotiations. The following key points summarize the analysis:

Beef: U.S. access to the EU market is constrained by both TRQs and the EU ban on beef from cattle treated with hormones.

- An increase in TRQs without SPS reform would likely increase exports of hormone-free U.S. beef to the EU if more U.S. producers participate in NHTC production.
- The removal of the hormone ban without TRQ reform would allow all U.S. beef to be eligible for export to the EU, but TRQs could still limit trade expansion. U.S. exports might compete at high over-quota rates, but the outcome will depend on EU acceptance of U.S. products.
- Removal of the hormone ban along with TRQ reform could lead to significant expansion of U.S. beef exports to the EU, but the actual outcome will depend on EU consumer preferences for hormone-treated beef. Above-quota imports are possible because beef can be produced at lower cost if producers do not need to participate in the NHTC program, especially if above-quota tariff rates are lowered.

Broiler meat: The EU's restriction on use of PRTs, including chlorine wash, effectively bans U.S. exports. U.S. producers have, so far, not attempted to comply with the EU PRT ban.

- An increase in TRQs without PRT reform would likely not change the level of U.S. exports to the EU, as PRT use in the United States is widespread. It is possible that U.S. producers could make changes to production practices to comply with the EU's PRT ban, but this has yet to occur.
- The United States exported broiler meat to several European countries before they joined the EU. If the PRT ban is removed, it is plausible that these countries would resume importing broiler meat from the United States. The amount of imports, however, would be sensitive to current TRQ allocations, likely leading to lower totals than in the years before their accession to the EU.
- Previous market presence in newly joined EU member states suggests that removal of the PRT ban could expand U.S. broiler exports to the EU market. The amount of expansion would be dependent on consumer acceptance of U.S. broiler meat and competition with Brazil and Thailand.

Pork: U.S. access to the EU market is restricted by the ban on ractopamine, restrictive TRQs, and other NTMs that have limited U.S. exports.

- An increase in TRQs without SPS measure removal may have a positive effect on U.S. pork exports conditional on increased U.S. production of ractopamine-free pork through the “never fed beta-agonists” program aimed at producing ractopamine-free pork. Removal of SPS measures may also generate an expansion of U.S. pork exports, but the amount of the increase may be limited without TRQ reform.

- If EU SPS measures are removed, U.S. producers would likely be able to increase production to facilitate an increase in U.S. pork exports; however, without a significant restructuring of TRQs, the United States would remain at a distinct disadvantage to other pork-exporting countries.
- U.S. pork supplies are likely sufficient to meet an increase in EU demand if both TRQs and SPS measures are removed; however, the level of EU demand for pork treated with ractopamine is uncertain. Newer EU member countries did import significant levels of U.S. pork before joining the EU.

This analysis outlines the economic significance of EU SPS measures and TRQs on U.S. meat exports and the complexity behind assessing potential trade gains from the modification or removal of the measures. Future research seeking to quantify the effects of NTMs should consider the joint effects of SPS measures, TRQs, and other NTMs. Estimates of potential gains from participation in the TTIP requires the simulation of different policy scenarios that may account for the important interplay between these barriers. Future research might also consider the scenario of exports outside the quota but at much higher over-quota tariffs. However, it might be more difficult to sell U.S. beef at a discount, compared with domestically produced EU beef, given the high over-quota rates. The outcome would depend on the willingness of EU consumers to pay a premium for nonhormone beef.

The analysis also underscores the importance of further policy adjustments that may arise from changes in the NTM regime. The removal of an SPS measure could lead to counter-policy measures in other NTMs or technical barriers to trade. It is important to consider the potential policy reverberations of SPS/TRQ reform and possible U.S. industry responses when assessing the gains from removing NTMs.

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