Does Brazil Pose a Threat to the U.S. Pork Industry?

Celso Weydmann\textsuperscript{1} and Kenneth Foster\textsuperscript{2}

Purdue University
Department of Agricultural Economics
Staff Paper number is #03-04

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Abstract

The modern technology for pork production is relative transportable. With abundant grain and open space for manure disposal, Brazil represents a potential target location for future expansion of pork production. In fact, the Brazilian pork industry has been expanding in recent years in terms of both production and exports. This paper examines the potential for Brazil to be a competitor with the U.S. in the world pork market. The general conclusion is that Brazil does not currently pose a threat to the U.S. industry, but there are several key factors that could change that in the future. These key factors are important information for U.S. decision makers to follow in developing their own strategies for competition in this volatile global market.

\textsuperscript{1} Visiting Scholar in the Agricultural Economics Department at Purdue University. Scholarship from CNPq, Brazil and Professor of Economics at Universidad Federal de Santa Catarina, Brazil (celsolw@cse.ufsc.br).

\textsuperscript{2} Professor in the Department of Agricultural Economics at Purdue University (kfoster@purdue.edu).
Does Brazil Pose a Threat the U.S. Pork Industry?

Introduction

The U.S. agricultural community is very familiar with the rise of Brazil as the chief U.S. competitor in the global soy market, and it should be no surprise that Brazilian farmers are now attempting to add value to their grain by feeding it to livestock. Much of the technical expertise that has fueled Brazil’s rising pork production is being transferred from North America and Western Europe and provides a premonition that the Brazilian pork industry might evolve (similar to grain case) into a significant rival in the pork export market.

In recent years, the U.S. has been a net exporter of pork despite a world pork market that became more competitive as new suppliers such as Canada, Brazil, Australia, Mexico, and Spain entered the market. Export markets are an extremely important activity in the U.S. pork sector because they have allowed the industry to gain economies of scale without generating a supply in excess of demand that would otherwise lead to lower prices. For developing countries like Brazil, pork exports also have the potential to add value to grain even though income levels in Brazil currently are insufficient to sustain a high per capita demand for pork.

In this paper, we examine the factors leading to expansion of pork production in Brazil and the competitive position of the Brazilian pork industry vis-à-vis the U.S. in the global marketplace. We do this in order to draw conclusions about the degree to which Brazil is currently a threat to the U.S. and also to identify the chief constraints that must be overcome in the Brazilian industry that might change their competitive position. These constraints serve as indicators for decision makers in the U.S. to watch in the future as they determine strategies to remain competitive in the rapidly changing world pork market.
Overview of Brazilian Pork Industry

As pointed out by Drabenstott, 1998; and Haley et al, 1998, Brazil has a favorable economic climate for raising hogs due its abundant and inexpensive land and labor, large areas to spread hog manure, lax environmental regulations, and relatively low grain prices for feed. Some, however, will still be surprised by the fast pace at which pork production and exports have increased in Brazil. Table 1 shows that, from 1997 to 2002, hog production in Brazil increased 51 percent while in the U.S. production grew by only 11 percent. Pork exports from Brazil soared 345 percent and U.S. exports increased 42 percent during the same time period. As a result, the share of Brazil in the world pork market evolved from 3 to 10 percent, while the U.S. market share of volume has been relatively steady between 17 and 20 percent (see Table 2). U.S. exports have benefited over the past decade from exotic animal diseases such as Foot and Mouth Disease (FMD) in several important exporting countries such as Taiwan, Korea, and, during the first half of 2001, Denmark. On the other hand, Brazil has succeeded in becoming a low cost supplier in the Russian market.

The Brazilian ascension to one of the most important pork exporters without having a previous important trade record implies that the world pork market can be quite dynamic in

<table>
<thead>
<tr>
<th>Countries</th>
<th>Production</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>1997</td>
<td>2002$^f$</td>
<td>% change</td>
<td>1997</td>
<td>2002$^f$</td>
</tr>
<tr>
<td>China</td>
<td>35963</td>
<td>43200</td>
<td>20</td>
<td>158</td>
<td>125</td>
</tr>
<tr>
<td>European Union</td>
<td>15906</td>
<td>17800</td>
<td>12</td>
<td>972</td>
<td>1325</td>
</tr>
<tr>
<td>United States</td>
<td>7835</td>
<td>8715</td>
<td>11</td>
<td>474</td>
<td>674</td>
</tr>
<tr>
<td>Russian Federation</td>
<td>1570</td>
<td>1550</td>
<td>-1</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Brazil</td>
<td>1540</td>
<td>2340</td>
<td>52</td>
<td>82</td>
<td>365</td>
</tr>
</tbody>
</table>

$^f$ As a result of the Foot and Mouth Disease outbreak Taiwan's entire pork industry collapsed, and the country is no longer a significant competitor in the global pork market.
Poland                      | 1540 | 1620 | 5   | 284 | 110 | -61 | 41  | 17  | -59 |
Japan                       | 1283 | 1230 | -4  | 0   | 0   | 786 | 1070| 36  |
Canada                      | 1257 | 1800 | 43  | 420 | 750 | 79  | 59  | 90  | 53  |
Taiwan                      | 1030 | 900  | -13 | 70  | 0   | -100| 0   | 0   | 0   |
Mexico                      | 940  | 1085 | 15  | 0   | 0   | 82  | 315 | 284 |
Other Countries             | 4859 | 4928 | 1   | 363 | 369 | 2   | 193 | 403 | 109 |
Total                       | 73723| 85168| 1   | 2823| 3718| 2   | 193 | 403 | 109 |

forecast:                   
Source: FIS/USDA


terms of new entrants, and that new entrants may represent a substantial threat to pork exporting countries like the U.S.

Most of the recent growth in pork exports from Brazil to Russia has been in lower-priced frozen carcass and half-carcasses while frozen pork exports from U.S. to Russia have declined. Furthermore, Russia is an important market for low value U.S. poultry and the potential for substitution with low value Brazilian pork comprises a threat to the U.S. poultry industry. It should be noted that because of unit value differences the volume of trade numbers reported in the tables above may overstate Brazil’s importance to the pork market in a value sense. However, product differentiation and value adding activities that add to unit values are of lesser importance when examining demand in markets like Russia where low incomes encourage bargain shopping over product quality attributes.

Even with its fast paced growth, the Brazilian industry faces some daunting obstacles that must be addressed in the longer term. Currently, Brazilian exports come from just one state and go mostly to a single importing country. Foot and Mouth Disease has not been eliminated in some parts of Brazil that have great potential for hog industry expansion. The currently lax environmental legislations allow lower costs of production at present but may be a barrier to

Table 2. Pork Meat Trade Performance. 1,000 metric tons.

<table>
<thead>
<tr>
<th>Years</th>
<th>Trade</th>
<th>Consumption</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>USA</td>
<td>BR</td>
</tr>
<tr>
<td></td>
<td>Exp</td>
<td>Qty*</td>
</tr>
</tbody>
</table>

4
entry in the future for markets that place a premium on environmentally sustainable production practices. Despite the noticeable production and export growth, these constraints motivate an analysis of the long term competitive position of Brazil and the U.S. in the world pork market.

**Brazilian Pork Exports**

The Russian market accounted for 57 percent and 81 percent of overall Brazilian pork exports in 2001 and 2002 (Table 3). Table 3 also shows the positive growth rates of Brazilian pork exports going to other main importing countries between 1997 and 2001.

Table 4 shows that the consumption has been increasing in the Russian market since 2000 but has not reached the previous high levels of 1997. Thus, the Russian market is likely to continue importing pork from Brazil in the future, and Russia may be indicative of other

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<thead>
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<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Argentina</td>
<td>25,606</td>
<td>35,247</td>
<td>33,665</td>
<td>36,597</td>
<td>38,665</td>
<td>3,148</td>
<td>9</td>
</tr>
<tr>
<td>Hong-Kong</td>
<td>27,893</td>
<td>37,835</td>
<td>40,200</td>
<td>49,506</td>
<td>47,436</td>
<td>11,459</td>
<td>14</td>
</tr>
<tr>
<td>Russia</td>
<td>-</td>
<td>42</td>
<td>-</td>
<td>23,274</td>
<td>151,826</td>
<td>96,711</td>
<td>552**</td>
</tr>
<tr>
<td>Uruguay</td>
<td>4,620</td>
<td>4,291</td>
<td>7,496</td>
<td>5,627</td>
<td>8,614</td>
<td>1,937</td>
<td>16</td>
</tr>
<tr>
<td>Others</td>
<td>5,708</td>
<td>4,192</td>
<td>5,926</td>
<td>12,879</td>
<td>18,624</td>
<td>5,656</td>
<td>42</td>
</tr>
<tr>
<td>Total</td>
<td>63,827</td>
<td>81,565</td>
<td>87,287</td>
<td>127,883</td>
<td>265,165</td>
<td>118,911</td>
<td>39</td>
</tr>
</tbody>
</table>

Source: ABIECS Annual Report. (ABIECS, Brazilian Association of Pork Processing Industry)

(*) January to April; (**) From 2000 to 2001.
potential growth markets around the world such as Eastern Europe, South America, and Asia where consumers are more concerned about price than prohibiting entry of exotic animal diseases.

Table 4. Russian Swine and Pork Production and Trade

<table>
<thead>
<tr>
<th></th>
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<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>** Swine (1,000 head) **</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total Supply*</td>
<td>51,971</td>
<td>49,910</td>
<td>47,614</td>
<td>47,135</td>
<td>46,835</td>
<td>46,965</td>
<td>47,305</td>
</tr>
<tr>
<td>Slaughter</td>
<td>28,000</td>
<td>29,130</td>
<td>27,950</td>
<td>27,350</td>
<td>27,450</td>
<td>27,690</td>
<td>27,760</td>
</tr>
<tr>
<td>Pork (1,000 tons; carcass weight equivalent)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Production</td>
<td>1,700</td>
<td>1,570</td>
<td>1,510</td>
<td>1,490</td>
<td>1,500</td>
<td>1,530</td>
<td>1,550</td>
</tr>
<tr>
<td>Imports</td>
<td>688</td>
<td>886</td>
<td>708</td>
<td>830</td>
<td>508</td>
<td>550</td>
<td>630</td>
</tr>
<tr>
<td>Consumption</td>
<td>2,387</td>
<td>2,455</td>
<td>2,217</td>
<td>2,319</td>
<td>2,007</td>
<td>2,079</td>
<td>2,179</td>
</tr>
</tbody>
</table>

Source USDA, FAS, Commodity and Marketing Programs, Dairy, Livestock, and Poultry Division
p - preliminary; f - forecast; * total supply = beginning inventories + pig crop + imports

Using data from table 3 and table 4, it is possible to estimate that pork meat imported from Brazil accounted for 4.5 percent and 9.4 percent of the total pork imported by Russia in 2000 and 2001, respectively. As mentioned earlier, low cost is the primary reason behind Russia’s growing purchases of Brazilian pork. Brazilian pork tends to receive lower prices because Brazil is banned from exporting to the higher valued markets in Japan, Western Europe, and the United States because parts of Brazil are not free of FMD. While the disease may not be active in Brazil’s pork industry the use of vaccines against FMD and the inability to distinguish between an infected and a vaccinated animal makes it impossible to certify the herd as FMD free.

Geography of Brazilian Pork Production

Brazilian hog production has traditionally been concentrated in the Southern part of the country, as seen in table 5. The three states in the Southern region increased their shares of total
inventory during 1990-2002, and Santa Catarina (SC) has maintained the highest share of the
Brazilian hog inventory since 1995.

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>South Region</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Santa Catarina (SC)</td>
<td>19.0</td>
<td>23.0</td>
<td>25.3</td>
<td>25.0</td>
</tr>
<tr>
<td>Rio Grande do Sul (RS)</td>
<td>21.3</td>
<td>22.2</td>
<td>24.8</td>
<td>24.2</td>
</tr>
<tr>
<td>Paraná (PR)</td>
<td>20.3</td>
<td>20.4</td>
<td>22.7</td>
<td>23.1</td>
</tr>
<tr>
<td><strong>Southeast Region</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>São Paulo (SP)</td>
<td>11.5</td>
<td>10.9</td>
<td>8.3</td>
<td>7.9</td>
</tr>
<tr>
<td>Minas Gerais (MG)</td>
<td>18.8</td>
<td>16.8</td>
<td>15.5</td>
<td>15.4</td>
</tr>
<tr>
<td><strong>Center West Region</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mato Grosso (MT)</td>
<td>5.9</td>
<td>4.6</td>
<td>4.0</td>
<td>4.0</td>
</tr>
<tr>
<td>Goiás (GO)</td>
<td>10.7</td>
<td>8.7</td>
<td>6.3</td>
<td>6.4</td>
</tr>
<tr>
<td>Distrito Federal (DF)</td>
<td>0.2</td>
<td>0.3</td>
<td>0.4</td>
<td>0.4</td>
</tr>
<tr>
<td>Mato Grosso do Sul (MS)</td>
<td>2.9</td>
<td>3.6</td>
<td>3.0</td>
<td>3.0</td>
</tr>
<tr>
<td><strong>Sum</strong></td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>100</td>
</tr>
</tbody>
</table>

| % of Brazilian Production | 52.2 | 58.9 | 68.7 | 70.8 |

(*) Preliminary data; (**) Estimates; (1) It does not include the states of Rio de Janeiro and Espirito Santo. (2) The Distrito Federal is the area in the surroundings of Brasilia.

Source: CONAB-BR (Companhia Nacional de Abastecimento) (http://www.conab.gov.br/)

The Center-West region, where the hog sector has the great expansion potential, did not increase its share of the inventory in the last decade. However, the states of Mato Grosso do Sul (MS) and Distrito Federal (DF) expanded their shares of total inventory during 1990 to 1995 but their participation was still much lower than the states of the South region. Pork export activity is also concentrated in Santa Catarina, which accounted for 86 percent of total Brazilian pork exports (by volume) in 2001 as shown in table 6. Santa Catarina has the largest slaughter capacity in the country as well, slaughtering about 24 percent of the total Brazilian hog production.

<table>
<thead>
<tr>
<th>States</th>
<th>Export (tons)</th>
<th>% of Brazil Slaughtered</th>
<th>% of Brazil</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
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</tr>
</tbody>
</table>

Table 6. Pork Export and Hog Slaughtering by States in Brazil. 2001.
Corn accounts for the major fraction of the costs of hog production costs at the farm level, and information about the grain sector may shed some light on the structure of the Brazilian pork industry and its future evolution. Corn production in Brazil averaged 36 million tons during the 1990s; which was a 50 percent increase higher from the previous decade. This increase did not keep pace with growth in domestic demand, and corn imports into Brazil averaged over one million tons annually in the 1990s. High humidity, short day length, and drought in the summer have caused greater variability to corn yields in the Center-West region and prevent corn expansion despite relatively favorable prices and strong demand (Schnepft et al, 2001).

As a consequence of the demand and supply imbalance, corn prices have been highest in the Southern states. The highest corn prices over the past six years occurred in Santa Catarina ($2.71 per bu) and were ten percent or more higher than the corn price in the Center-West States. Because the southern region is a high demand area for corn as one goes further away from this region the price of corn falls.

Table 7 shows that corn production in Santa Catarina was 30 percent and 19 percent below the state’s demand in 2000 and 2001, respectively. The primary causes of the imbalance are the expansion in hog production and the uneven topography of the region that makes large-

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Santa Catarina (SC) | 219,933 | 86 | 6,391,067 | 24.1
Rio Grande do Sul (RS) | 36,702 | 13.8 | 4,005,518 | 15.1
Paraná (PR) | 7,367 | 2.8 | 2,788,518 | 10.5
Minas Gerais (MG) | 306 | 0.1 | 1,484,659 | 5.6
São Paulo (SP) | 857 | 0.3 | 1,010,788 | 3.8
Others | 10,857,788 | 40.9
Total Brazil | 265,165 | 100 | 26,538,143 | 100

Source: ABIPECS/ Brazil.

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4 Argentina was the main source of Brazilian corn imports during this period.
5 Source: CONAB, Brasilia.
scale farming and corn production difficult. These factors suggest that the state and the southern region as a whole may have increasing difficulty in further expanding hog production and future expansion would have to occur in one of the other geographic regions.


<table>
<thead>
<tr>
<th>Year</th>
<th>Production</th>
<th>Demand</th>
<th>Deficit</th>
</tr>
</thead>
<tbody>
<tr>
<td>2000</td>
<td>3,455</td>
<td>4,536</td>
<td>-1,081</td>
</tr>
<tr>
<td>2001(*)</td>
<td>4,000</td>
<td>4,799</td>
<td>-799</td>
</tr>
</tbody>
</table>

(* Forecast.
Source: ICEPA-SC (Instituto de Planejamento e Economia Agrícola de Santa Catarina)
(http://www.icepa.com.br/principal.html )

This deficit means that a substantial amount of corn must be transported from other areas, mainly from Paraná (Rezende & Helfand, 1997), and consequently transportation cost accounts for some of the higher corn prices observed in Santa Catarina. Corn imports from Argentina have not been competitive because Paraná and Rio Grande do Sul are closer and are less volatile markets than Argentina.

**Competitive Strengths in Santa Catarina**

Even though corn prices are higher in Santa Catarina, the state has been successful in expanding hog production and pork exports primarily because it is the only area in Brazil that is considered free of Foot and Mouth Disease (FMD). Since 1992, the International Epizooties Office (OIE) has recognized that Santa Catarina is FMD free without use of vaccination. Under the WTO agreement, it is possible for a region within a country to be considered free of disease and thus eligible to export pork even though other parts of the country may either actively have the disease or be involved in a vaccination program against it. The disease still constitutes a

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6 The content about food and mouth disease is based on [http://www.ourfood.com/index.html](http://www.ourfood.com/index.html).
7 The OIE homepage is [http://www.oie.int/eng/en_index.htm](http://www.oie.int/eng/en_index.htm).
barrier to Brazilian exports, however, because the U.S., Japan, and European Union (EU) countries refuse to import meat and animals from Brazil as long as the disease is not completely under control throughout the country. According to the OIE, most of the states located in the Center-West region of Brazil are considered FMD disease free, but with active vaccination programs.8

Santa Catarina also benefits from its proximity to Argentina, Uruguay, and Paraguay. These were the traditional export markets for Brazilian pork and thus most of the human and physical capital to produce pork are centered in the Southern region near these markets. In addition, Santa Catarina is also one of the main poultry producing regions in Brazil, and the network formed by the hog and poultry sectors, feed, slaughter and other related industries contributes to the development of agglomeration economies. Those economies result in a more efficient industry relative to other parts of Brazil (Gillespie et al, 1997). The industry in Santa Catarina has evolved to one with a high degree of coordination between farmers and packers that has led to efficiency and quality improvements (Hennessy & Lawrence (1999)). Finally, hog operations in Santa Catarina are predominately family farms with lower labor costs that offset the high cost of feed and the economies of scale obtained by large-scale operations in the Center-West region (Talamini et al, 1999).

Competitive Weaknesses and Threats in Santa Catarina

Growing concern about the impact of hog production on the environment constitutes one of the primary threats to expanded hog production in Santa Catarina. It is estimated that only 40% of the 20,000 hog producers located in the western part of Santa Catarina had some form of

8 Vaccination programs typically preclude export because it is not possible to distinguish between an animal that is an active carrier of FMD and one that has been vaccinated.
hog waste management in 1995 (Testa et al, 1996). Also 85% of streams and rivers in the region are contaminated by fecal coliform (Takitane & Souza, 2000), and in many counties there is no new land available to spread manure if the hog inventory expands (Talamini et al, 1999). The rolling topography also contributes to the potential for water contamination due to runoff from manure storage and land that received a manure application. The combination of high corn prices and environmental concerns may motivate a transition of the industry toward the Center-West region where land is more abundant and corn prices tend to be lower. Such a move would be expected if the FMD problem showed signs of being remedied in the near future.

The report of a Food and Veterinary Office mission representing the European Commission⁹ raised questions concerning the reliability of control concerning animal health systems, specifically residues and certification of meat in Santa Catarina. The Commission concluded that so far the state is not able to export to the EU because it does not comply with some EU requirements (European Commission, 2002) such as no contingency plans for FMD and CSF (Classical Swine Fever) outbreaks, there are system failures in the certification of meat to preclude the distribution and use of veterinary drugs which are prohibited in Europe, and there are no reliable traceability systems in place.

**Potential for Expansion in other Brazilian States**

Several states have lower corn prices and also have larger land areas suitable for manure disposal than Santa Catarina. Therefore, it is reasonable to speculate about the potential development of the hog sector in those states. The state of Paraná is the largest producer of corn in Brazil and also has a tradition of hog production. Paraná is located closer to the domestic

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⁹ The mission took place in March of 2002 at the request of Brazilian authorities hoping to export fresh pig meat from Santa Catarina to the E.U.
population centers of São Paulo and Rio de Janeiro and has some advantage in serving those markets. State governments in the Center-West region offer incentives to farmers in the pork sector (see FAS/USDA)\(^{10}\), and large operations that can achieve economies of scale are more feasible than in the south. Some factors such as low population density, cheap land price, flat topography, dry weather, and soils deficient in nitrogen and phosphorus suggest a low compliance cost with environmental regulation for the Center-West region. Talamini et al (1999) went so far as to speculated that in the future, because of these factors, the West region may specialize in grower-finisher operations while the South region specializes in farrowing operations. That is, feeder pigs might be transported from the South to the West for finishing alleviating the south from its dependence on corn and land for manure disposal. Such a scenario already exists in the U.S. where feeder pigs are transported from North Carolina for finishing in the Midwest where corn prices are lower and land is available for manure disposal.

Typically, capital is a limiting resource to the expansion of intensive pork production in a developing country such as Brazil. However, because the technology and management systems are extremely transferable foreign investors have shown interest in investing in pork production in Brazil. This investment has waned somewhat with the decline in the Brazilian economy's performance in the past two years, but is expected to resume when growth resumes in the economy at large. An important implication of the outside investment capital is that it will undoubtedly encourage the adoption of modern production, marketing, and management systems across the entire industry in Brazil.

Comparison of Brazil and the U.S. Pork Industries

\(^{10}\) The quotation was extracted from http://www.fas.usda.gov/dlp/countrypages/brazil.html dated of 03/28/2002.
Hayes (1998) developed some estimates of farm costs of production for hogs in various countries. His analysis showed that Brazilian costs at the farm level were slightly higher than those in the U.S. and Canada but still among the lowest in the world. However, the competitive position of different exporting countries cannot be determined by looking only at farm level costs of production. It is difficult or perhaps impossible to make accurate comparisons of costs and revenues across countries for any segment of the market chain due to differences in the quality of products, production systems, and the market weights of animals produced that can confound both revenue and cost comparisons. An accurate across country assessment requires a focus on the profit margin of the entire pork sector.

Brazil’s higher feed costs are offset by extremely low land, labor and construction costs.\(^{11}\) Low labor costs benefit the Brazilian industry both at the farm and the slaughter levels making profit in the entire pork chain competitive with that in other major producing countries.\(^{12}\) However, the U.S. typically exports higher quality pork products primarily to Japan, and Brazil primarily exports lower value pork to Russia. While Brazilian exports are lower in unit value, they are not necessarily low quality cuts. The lower value assigned to Brazilian pork is due primarily to the status of FMD and CSF in the country. Expansion of the FMD and CSF free zone in Brazil could open higher valued export markets in the future leading greater head to head competition between Brazil and the U.S., Canada, and Denmark for the high valued markets in Asia and Western Europe. The lower production costs in Brazil could then lead to a competitive advantage and expansion of Brazilian exports at the expense of the U.S.

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\(^{11}\) For example, the land rental rate is $14 per acre in Paraná and $6 in Mato Grosso while it averages $88 in the U.S. Heartland and is much higher for the highest yielding land. Labor costs in Brazil at the farm level can be as low as $1 per hour.

\(^{12}\) After live hogs, labor cost in the processing industry is the largest single cost factor accounting between 30 to 40 percent of overall costs (Boehlje et al, 1997).
Some Drivers of Future Pork Trade

Brazil and other similar new entrants into pork production such as Mexico, Spain, and Poland do not currently constitute a threat to the U.S. pork industry’s export markets. However, there are a variety of scenarios that could unfold in the future to change that assessment. The following paragraphs endeavor to discuss the primary events or factors that could lead to a world market where Brazil would constitute a threat to U.S. pork exports. These factors constitute a “watch list” for producers and exporters in both countries to collect information about and to factor into their business strategies.

Traceability, Certification, and Quality

Japan, Western Europe, and North America comprise the largest markets for high value quality pork. These countries also impose very strict standards concerning health status of animal herds in the exporting countries. The EU also bans imports from countries that cannot certify that meat is free of antibiotics, synthetic hormones, or other growth promoters. This restriction essentially prohibits the importation of meat from outside the EU because no other part of the world is able to comply with that standard. In addition, these markets are quickly moving toward full traceability of meat products from the farm of origin to the consumer in an effort to safeguard human food safety and to certify various quality attributes about the product and how it was produced. Consequently, the first indicator that Brazil might begin to penetrate these markets will likely be the certification, by OIE, that Brazil is free of FMD and CSF. However, this by itself may not be a sufficient condition to open the high value markets to Brazil. Certainly, a traceability and antibiotic free certification will be required in order for Brazilian meat to penetrate the EU market. Furthermore, the EU has proven itself very adept at
respecifying the requirements before any significant outside competition can enter. Thus, one would expect that if another country were to be on the verge of meeting current EU standards, then the standards would be made even more restrictive to prevent entry of lower cost products from outside the EU. The potential for the EU to use animal welfare restrictions and guidelines as a barrier to meat and livestock imports is very real and would likely constitute the next level of protection should competitors manage to meet the health and anti-biotic use restrictions.

Another consideration in assessing Brazil’s potential to penetrate high value pork markets is the length of time that it takes to eradicate FMD. Haley and Jones (1996) suggested it takes at least five years from a FMD outbreak before a country can resume trade. However, they were referring to Taiwanese case that followed a stamping out policy versus a vaccination program like the one followed in Brazil. The use of a vaccination program would typically extend the period, but Brazil has several years of this program already completed.13

The countries importing high value pork products have relatively high standards of living with a fairly stable consumption of meat and pork. The pork markets in those countries could be said to be mature in the sense that there is little prospect for large growth in per capita consumption. Thus, the expansion in these markets has not been just in terms of quantity but also in terms of quality attributes and product differentiation. Pre-preparation, micro-wave readiness, leanness, and other value added or quality attributes have become the primary modes of competition in these markets.

Being FMD and CSF free could potentially open the Japanese and U.S. markets to Brazilian pork, but now that Denmark is able to export meat from animals that have not received

13 It should be noted that the severity of the outbreak is also key to determining the time lag between the disease occurrence and resumption of trade. Both Denmark and Ireland experienced small outbreaks of FMD in 2001 following the severe outbreak in the Great Britain. However, Denmark and Ireland were able to very quickly stamp out the disease and resume trade within a matter of only a few months while the Great Britain continues to operate under a trade ban two years later. The Brazilian case would be closer to that of the Great Britain if not more severe.
antibiotics it is possible that the Japanese market will make this a requirement for all suppliers in the near future. It is doubtful that Brazil would be in a position to comply with this requirement for many years. Even with segregated early weaning, all-in all-out, and multi-site production systems the vast majority of U.S. farms still routinely administer low levels of feed grade antibiotic to hogs. Denmark's relative success with anti-biotic free production hinges on the use of Specific Pathogen Free (SPF) technology in the breeding stock industry. This is a very costly technology and one that requires substantial organization within the industry. The Brazilian industry is still dominated by small family farms, but the trend in expansion is toward coordinated large scale production. The U.S. experience would suggest that Brazil is still at least ten years away from being in a position to coordinate SPF technology to the degree that would allow anti-biotic free production.

Growth Markets

A second group of importing countries purchase lower valued pork meat for food processing (such as whole carcasses). This group consists mainly of Eastern European countries, Russia, Philippines, Korea, Hong-Kong, and China, and price rather than quality is the most important factor that determines the source of imported meat which often means that they import low quality cuts of whole carcasses rather than deboned meat. The countries in this group are also more willing to accept meat from countries that are not free of FMD and CSF because they typically already suffer from the diseases themselves and have no significant meat export potential themselves. Unlike the first group of countries, this group has substantial potential to increase total demand for pork. These countries tend to typified by relatively low incomes but

14 In addition, it is expected that Danish pork will soon be shipped overland to Asia reducing the shipping time and allowing chilled rather than frozen pork exports from Denmark to compete in the Japanese market with fresh and chilled product from other sources such as the U.S., Canada, and Australia.
with potential for long term growth in wealth and thus demand for meat. Consequently, product innovation and differentiation will be less important to meeting the demand for protein in these countries.

Brazil has already demonstrated that it can penetrate these markets with its success in Russia. With the current status of FMD and CSF in Brazil it is likely that continued expansion into such markets and its domestic market will be the focus of the Brazilian pork sector. However, because these markets represent low unit values there will be increased incentive as the industry expands in Brazil to make the improvements necessary to address the needs of the high value markets. Brazil may find itself in a unique position in that the Center-West region does not have a strong existing industry and new investment can thus be tailored to fit the needs of antibiotic free production and traceability systems can be implemented from the ground-up. This is in contrast to the U.S. where existing facilities were not designed with these production and marketing practices in mind and would require substantial additional investment or incur inefficiencies in order to be implemented.

Consequently, it will be important to note the types of production and marketing systems that are implemented in the expanding Brazilian industry. The evolution of governance structure in the pork industry may be a very good indicator of Brazil’s future ability to switch from low valued markets like Russia to higher valued markets like Japan. For example, a vertically integrated structure or one that has a very high degree of coordination between the producer and the packer would indicate a situation where developing traceability and certification programs to meet high value market demands would be easier.

15 Governance structure in this context refers to the way in which successive stages of the production and marketing channel are coordinated. Different governance structures that have been observed in the pork industry include but may not be limited to: open markets, vertically integrated corporations or cooperatives, and contracts between private entities at points of product transfer.
Conclusions

Although Brazilian pork production and exports have been rapidly increasing in recent years, the extent to which it can penetrate import U.S. pork export markets is limited by the existence of Foot and Mouth Disease in Brazil. However, a similar assessment of the Brazilian soybean industry might have been made in the 1970’s, and today Brazil is a competitor in the soybean complex. Already low labor and construction costs in Brazil coupled with a reasonably favorable climate give it some competitive potential. Modern pork production and management technologies are extremely mobile and already large scale production systems that mimic U.S. and Western European technologies are being implemented in Brazil. Thus, the status of Brazilian production bears observation by decision makers in other Western Hemisphere pork exporting countries such as the U.S. and Canada. Formulating strategies to maintain a competitive advantage over new entrants such as Brazil requires continued focus on production and processing efficiency as well as a renewed focus on product development and differentiation to meet changing demands in high valued pork markets.

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