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Factors Influencing Global Poultry Trade¹

EDITOR'S INTRODUCTION

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World poultry trade has been on the rise over the last two decades and poultry meat continues to be the top animal protein exchanged globally. In 2000, countries worldwide exported over 8.79 million tons of poultry meat (excluding eggs). Last year (2014), the amount of poultry exported globally almost doubled (94% increase) from the total exported 15 years earlier (GTIS 2015). Shifts in world poultry trade have been influenced by rapid increases in poultry meat exports from Brazil and a sharp decrease in imports by Russia, sporadic outbreaks of avian influenza (AI) worldwide, sanitary regulations, exchange rate volatility, changes in population and income, and consumer preferences.

Recent events demonstrate that poultry trade remains sensitive to such influences. Over the past several months, there have been reported outbreaks of Highly Pathogenic Avian Influenza (HPAI) and Low Pathogenic Avian Influenza (LPAI) in addition to bilateral trade disputes. This has become problematic in many countries, resulting in trade reductions and/or the elimination of trade for major importing and exporting countries.

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In response to recent outbreaks of HPAI in poultry flocks in the United States, at least twelve countries (South Korea, China, Qatar, Kuwait, Azerbaijan, South Africa, Morocco, Algeria, Sri Lanka, Indonesia, Ecuador, and Argentina) have suspended imports of U.S. poultry products (FAS/OASA/AD-APHIS). Several other importing countries (39) have placed partial bans on poultry coming from certain counties within specific States. The targeted States include Washington, Oregon, Idaho, Minnesota, Missouri, Arkansas, Kansas, Wisconsin, South Dakota, North Dakota, Iowa, and Montana. Due to avian influenza outbreaks in the U.S., the Hong Kong government is requiring a mandatory health certification for all shell eggs, and other egg product exports, including powdered and liquid eggs (USDA-GAIN Report Hong Kong 2015). This mandate will be enforced starting December 5, 2015. Hong Kong is the third largest egg product market of the U.S. with a 2014 total value of over \$52 million.

In mid-October 2014, the World Trade Organization (WTO) ruled against India's ban on U.S. poultry imports, finding the ban inconsistent with its commitments under the WTO sanitary and phytosanitary agreement (National Chicken Council 2014). India imposed the ban in 2007, due to reports of LPAI in U.S. poultry. The mutation of LPAI into a highly pathogenic form of the virus was India's primary concern and reason for the ban. India has since filed an appeal against the WTO's rejection of its ban, citing the same reason initially used when the ban was imposed. Now India is dealing with its own issues of AI outbreaks. India's government informed the World Organization for Animal Health (OIE) of several highly pathogenic avian influenza (HPAI) H5N1 outbreaks on March 18 and 26, 2015 (USDA-GAIN Report India 2015). The areas within India affected by the AI outbreaks include Saari Ka Purwa village, Haliapur village, and Pahadpur Gaderiya Deeh village in Uttar Pradesh as well as Manipur and Andhra Pradesh.

Australia's HPAI outbreak in October of 2013, affecting about 400,000 egg-layer hens, resulted in Hong Kong temporarily banning poultry imports from New South Wales following this outbreak (USDA-GAIN Report Netherlands 2014). Similarly HPAI was found on five poultry farms in the Netherlands in November 2014. Countries that suspended the importation of Dutch poultry include: Hong Kong, South Korea, Ukraine, and South Africa. Estimates of the loss in export meat sales for the Dutch poultry sector range from \$100 to 200 million. Like many other countries, Ghana has alerted the OIE of outbreaks of AI (H5 Serotype) in its poultry flocks. The number of cases reported more than doubled after two weeks of Ghana's first OIE reporting on June 2, 2015, despite efforts made to control AI outbreaks within the country. Other African countries, such as Nigeria, Burkina Faso, Niger, and Côte d'Ivoire, have also reported AI outbreaks since December 2014 (Minister of Food and Agriculture, Republic of Ghana 2015). More recent cases of HPAI have been confirmed in Turkey. Outbreaks were detected in Ikizciler, Kastamonu Province; Edincik, Balikesir Province; and Moralilar, Manisa Province in late April 2015 and on May 11, 2015 (USDA-GAIN Report Turkey 2015). All infected animals within a 3 km radius were destroyed. Protection and surveillance zones have been established 10 km radius surrounding this 3 km radius area. Given the number of outbreaks and continents in which cases have been reported, it is evident that AI is clearly a persistent and dangerous problem for global poultry industries and trade, and HPAI remains a potential threat to human health.

Anti-dumping (AD) disputes also disrupt the flow of poultry trade. For example, China imposed AD duties and countervailing measures on poultry imports from the U.S. in 2009. After a WTO

investigation, a decision was given ruling against China stating that these measures were in violation of WTO rules, and duties on China's imports were reduced (Office of the United States Trade Representative 2013).

Approximately 15 years ago, South Africa imposed AD duties on the U.S. that hindered the flow of chicken meat into South Africa. In addition to the U.S., South Africa has also imposed AD duties on frozen chicken imports from Brazil, and on some chicken products from Germany, the Netherlands and the UK. On April 16, 2015, the U.S. Poultry and Egg Export Council (USAPEEC) and South African Poultry Association (SAPA) encourages the negotiation of a tariff-rate quota (TRQ) volume that would take into account the amount of market access U.S. producers previously held in South Africa (Business Day BD Live 2015). However, on June 5, 2015, negotiations between the two governments produced an agreement that will eliminate South African AD duties and allow the U.S. to export 65,000 tons of bone-in chicken to South Africa annually at Pretoria's most-favored nation (MFN) duty of 37%, without AD duties. This agreement also establishes a path toward resolving longstanding spats concerning sanitary and phytosanitary (SPS) measures involving U.S. chicken, beef and pork (Inside U.S. Trade 2015).

Given the large size of poultry trade and the current challenges it faces, the objective of this IFAMR special issue is to examine and discuss how global poultry trade is affected by avian influenza, sanitary restrictions, production efficiency, price and exchange rate volatilities, tariffs and TRQs, and other factors. The special issue features 16 studies that discuss ways economic factors and trade impediments have affected world poultry trade. The studies generally focus on specific factors that have affected poultry trade in particular regions, and the following summary reviews global poultry trade concerns from a regional perspective. The regions explored in this special issue include North America, Asia, Africa, Europe, the Caribbean, and South America.

North America

Zhuang and Moore provide a U.S. perspective on factors influencing poultry exports. The factors that cause the most impediments to U.S. poultry exports are EU technical trade barriers, Indian protectionism using avian influenza as a guise, various anti-dumping cases, Russia's ban in retaliation to U.S. economic sanctions, and religious trade barriers encountered in some Muslim countries. Despite these challenges, *Zhuang and Moore* postulate that the production efficiency of poultry and increasing income and population in developing countries will produce a positive outlook for U.S. poultry exports over the next decade.

Johnson et al. provide an international perspective on how certain factors contribute to export market recovery after highly pathogenic poultry disease events. Factors that may influence the length of export market recovery include disease type, product type and value, world supply, disease management timelines, disease event size and duration, and country credibility (FAO, 2006). Guidelines established by the World Organization for Animal Health (OIE) suggests that countries previously free of AI can obtain disease free status three months after the last bird affected by AI is culled. However, acquiring this status does not always mean that the export market would recover immediately (Paarlberg 2007; Junker et al. 2009; Hagerman et al. 2012; Philippidis and Hubbard 2005). After a highly pathogenic disease has been discovered in a major poultry exporting country and reported by OIE, importers can make three decisions: 1) determine

whether to ban imports from a country with an HPAI or Newcastle Disease outbreak, 2) choose whether a trade ban applies to the entire country or a specific geographical area, and 3) decide the amount of time a ban will remain in effect.

Findings show that the duration of the disease event affects the revenue recovery time. Revenue recovery for a poultry exporter is expected to improve more rapidly if its exchange rate falls. Johnson et al. also find that repeated outbreaks of highly pathogenic poultry diseases cause the revenue recovery time to change by a factor of 1.17. Being an agrarian country had an effect on expected recovery time as well. Recovery time for agrarian producers is expected to change by a factor of 0.65.

Ollinger and Taha analyze the economic forces responsible for diminishing levels of *Salmonella* reported in U.S. chicken processing plants. Excessive levels of *Salmonella* have been one of the reasons countries have imposed bans on poultry imports (Mathews et al. 2003). U.S. poultry processing plants uphold a very low or zero tolerance for *Salmonella*. This is extremely important to several major importing countries because the U.S. is a major exporter of broiler and turkey meat. This article explains how poultry plant size, whether a plant further processed poultry, and lower tolerances for *Salmonella* mandated by Food Safety and Inspection Service (FSIS) resulted in lower levels of *Salmonella* in U.S. poultry. *Salmonella* levels declined from 13 percent of the test sample showing positive *Salmonella* levels in 2006 to only three percent in 2012.

Their findings suggest that, compared to other plants, further processors were about 17 percent more likely to have a food safety performance equal to one-fourth the FSIS *Salmonella* tolerance and 15 percent more likely to have a food safety performance equal to one-sixth the FSIS *Salmonella* tolerance, but further processing was not likely to have one-twelfth the *Salmonella* tolerance level mandated by FSIS. The implication of this study is that low or zero tolerance for *Salmonella* could build poultry exports a strong reputation for food safety, which could enhance poultry exporters' bargaining position.

Price and exchange rate volatilities are two factors that have been known to influence agriculture trade and cause risk-adverse producers to sometime limit product sales to domestic markets. *No et al.* examine pricing-to-market and exchange rate pass-through in the U.S. broiler meat export market using the PTM model as an estimation method. This study fills a research gap by introducing a between panel specification to document the long-run pricing-to-market strategy of U.S. broiler exporters. Previous studies used a fixed specification of panel regression that provided only a short-run pricing behavior in export destination markets.

Findings show that the magnitude of short term transient pricing-to-market is much greater than persistent long run pricing-to-market. These results add further evidence of pricing-to-market behavior in exchange rate pass-through literature. Differences found in this study may be used by policymakers to reduce short run expectations on part of businesses and consumers who will be influenced by exchange rate changes.

Nehring et al. provide insight into what is driving U.S. broiler farm profitability. To examine broiler farm profitability, the authors decompose profitability into four components: net return on

assets, asset efficiency, solvency, and net return on equity. One of the important driving factors pointed out is the structure of the broiler industry. The structure of the broiler industry is characterized by high feed efficiency conversion and relatively low production costs per pound of broiler meat. These characteristics have made the U.S. market particularly competitive on a global level.

In addition to acknowledging the importance of technology that improves productivity, this study suggests the main drivers of higher return on equity in U.S. broiler production are farm size, diversification, and housing vintage, where larger, more diversified farms using older housing experienced greater profitability, asset efficiency, solvency, and return on equity. Authors also found that off-farm income was another characteristic of broiler farms and a contributing factor to farm financial performance. The result of high productivity led to greater exports (MacDonald 2008).

Bishop, Jr. et al. shift the focus from national to state in their assessment of Georgia's poultry industry and its impact on the local economy and global trade. Georgia is the largest broiler and poultry producing state with 105 counties that average over \$1 million in poultry sales annually. In 2013, the State of Georgia exported almost 539,600 metric tons of broiler chickens valued at \$685 million (U.S. Department of Agriculture-FAS 2014). In Georgia's second Congressional District alone, the poultry industry created 10,893 jobs and \$2.25 billion in total economic activity in 2011.

Asia

Relevant to the most recent HPAI outbreaks in the U.S., *Davis and Dyck* examine the impacts of AI shocks to a trading system, particularly Korean and Japanese poultry trade. Over the past several decades, avian influenza outbreaks have disrupted the supply of fresh, frozen, and live chicken poultry trade. HPAI outbreaks in China and Thailand have ended the exports of frozen chicken meat from those countries to Japan and Korea; however, cooked meat was still exported. More recently, HPAI outbreaks occurred in the United States and as a result of these outbreaks, Korea banned frozen poultry meat imports from the United States. A Rotterdam model was used to estimate chicken meat trade for 1996-2013 for Japan and 2005-2013 for Korea.

In the Japanese market, the major chicken exporters are the U.S., Brazil, China, and Thailand. Findings suggest that before the restriction (1996-2003), China and Brazil own-price elasticities have the greater impact and more significant role in explaining changes in Japanese imports of chicken meat than do the Thai, U.S., or Rest of the World (ROW) own-prices. However, after the restriction (2004-2013), the U.S. and the ROW own-price elasticities are elastic (1.14 and 1.99, respectively). Given Korea's ban on U.S. frozen poultry meat, findings from this study suggest that Brazil will substitute for Korean imports from the United States. If Brazil were also affected, findings suggest that processed poultry meat imports from Thailand and China would rise.

Already the United States' leading agricultural trading partner, *Marchant and Xie* explore the potential for China to become a larger importer of U.S. poultry meat. The authors examine China's demand, supply, food safety, and trade barriers which affect poultry trade between the

two countries. While China is the second largest producer of poultry products, behind the United States (Pi, Zhang and Horowitz, 2014), its demand for poultry meats has grown along with population and income. The authors note that China is not one of the top U.S. poultry export destinations, because it is currently able to produce enough for its own consumers. However, in the long-run, as the poultry sector in China deals with high feed costs, particularly for maize and soybeans coupled with other potential food safety issues, the U.S. poultry industry may benefit from access to world's largest poultry market.

Gale and Arnade elaborate more on the effects of rising feed and labor costs on China's chicken price. Over the past three decades, China poultry production grew about ten-fold. China exported poultry to neighboring Asian countries and imported large quantities of poultry, particularly paws and wings. However, lately growth in poultry production has been constrained due to high feed prices and wages (Ke and Han 2007; Pan 2013). Rising demands for feed grains and unfavorable price support policy coupled with rural residents' pursuit of nonfarm employment have given rise to high chicken prices. The authors' findings suggest that a 10% increase in corn and soybean meal prices will cause domestic chicken prices to increase 4.4%. Their findings also reveal that changes in corn and soybean meal price are asymmetric and that decreases in these two input prices are associated with a stronger change in chicken prices than are increases in those prices.

Hellin et al. analyze the rapid growth of India's poultry industry and discuss potential for global poultry trade. Like the U.S. and Brazil, the majority of India's poultry industry is dominated by large scale vertically coordinated farms. India's rapid growth in poultry production is fueled by scientific advances in poultry breeding and disease control, and the availability of low-priced feed (Ravindran 2013). Over the last ten years, corn availability has increased as corn production in India has grown by 56%. Large corn supplies have contributed to lower-priced poultry meats. The authors pointed out that while India is responsible for less than 0.4% of the world poultry trade, its poultry exports have increased from almost 517,000 tons in 2010-11 to 578,000 tons in 2012-13. Larger poultry farms, competitive prices, and Indian entrepreneurship are factors the authors believe will allow India to take a more active role in the global poultry trade.

Africa

Like some of the previous studies mentioned above, *Taha and Hahn* provide insight into the factors driving poultry and meat imports, but their focus is on South Africa. According to the authors, imported poultry is the fastest growing meat product in South Africa. This study evaluates three crucial factors to determine which variable affects South Africa meat imports the most: 1) changes in consumer taste and/or meat processing technology, 2) poultry and meat prices, or 3) scale or size of the meat import market.

The authors find that changes in taste and technology had a larger impact on South African increased demand for imported poultry and pork than did changes in poultry or pork prices. Unlike previous studies, the authors' estimates show that poultry prices have had small impacts on long-term trends in South African meat imports. Their findings also suggest that poultry is a substitute for pork, sheep/goat, and offal.

Nourou seeks to identify any commonality in the volatility processes of prices for poultry and other agricultural food commodities not only in Cameroon but the world. The motivation for this study was fueled by large changes in food prices occurring after the financial crisis of 2008. This study analyzes the volatility transmission between poultry price and other commodity prices such as beef, fish meal, food and beverage price index, fuel, and a collection of all other commodities. To measure the degree of poultry price volatility, the author used standard dispersion indicators. Specified poultry international price volatility at time “t” was obtained from GARCH-type models.

The findings indicate that poultry prices experienced less volatility over the last several years relative to beef, fish meal, food and beverage price indexes, fuel, and all other commodities. The author also discovered that the transmission of price volatility from other agricultural food commodities to poultry prices is rather weak. One of the implications of this study is that poultry prices are less sensitive to agricultural food commodities’ prices and agribusinesses could consider poultry as a relatively safe activity when building their portfolio of activities.

Heise et al. shift the focus and look at the advantages and disadvantages of market entry of foreign companies into Nigeria’s poultry industry. Poultry is an important source of animal protein for Nigeria. Import demand for eggs and poultry meat has significantly increased in recent years, and Nigerian poultry production has not kept pace with the rapid increase in domestic consumption. This study looks at expanding Nigeria’s poultry industry and the benefits and challenges of doing so. The authors paint a vivid picture of Nigeria’s political climate, economy, social cultural, available technology, ecology, and legal factors.

Using a political, economic, social-cultural, technological, ecological, legal (PESTEL) analysis and strengths, weaknesses, opportunities, threats (SWOT) analysis the authors assess the environment and current state of the poultry market in Nigeria and determine the attractiveness of market entry from the perspective of a foreign direct investor. Findings from this study reveal that the PESTEL and SWOT analyses suggest that the market for poultry products in Nigeria cannot be assessed as clearly positive or negative but reveals a mixed picture. Some points that may cause investors to entry Nigeria poultry markets are favorable agricultural policies, strong GDP growth, and growing demand. However, challenges such as poverty, high unemployment, and corruption may cause foreign investors to have second thoughts.

Europe

Like the United States, Europe, particularly Germany, the Netherlands and the United Kingdom have recently reported outbreaks of avian influenza. During HPAI outbreaks from 2005 to 2014, data show that EU-27 imports of uncooked poultry declined while imports of cooked poultry rose. *Taha and Hahn* analyze HPAI impact on EU-27 import demand for cooked and uncooked poultry and other meats. Findings suggest that HPAI outbreaks had statistically significant impacts on EU27 import demand for meats. Cooked poultry imports increased during HPAI outbreaks and imports of uncooked poultry along with beef, pork, and other meats declined. The authors’ findings suggest that EU consumers have become quite sensitive to HPAI outbreaks and have developed a strong taste for imported cooked poultry meats. This shift in import demand has become permanent and is statistically significant. According to the authors, EU-27 cooked poultry

imports has become largest of all meats imported, accounting for almost half of EU-27 imports during 2012-2014.

The Caribbean

Walters et al. analyze the demand for imported poultry products in the Caribbean Community (CARICOM), and evaluate a modified Common External Tariff (CET) for poultry products from the United States, Brazil, Canada and the European Union. As poultry meat imports continued to grow, government officials and the Caribbean Poultry Association expressed concern and requested stronger support and protection for the domestic poultry industry against lower-priced imported poultry meats (Agritrade 2011, 2012). In attempt to address this issue, the authors evaluated two scenarios: (1) doubling of the CET rate to 80% and (2) complete removal of the CET. The current CET used for imported agricultural commodities by CARICOM member states is 40%.

Findings reveal that own-price elasticities for CARICOM's poultry import demand is highly price responsive in both the short run and the long run. *Walters et al.* also show that both the U.S. and Brazil stand to benefit from poultry import growth into CARICOM during the short- and long-run, if the CET is removed. In the study, the largest benefactor was Brazil whose poultry shipments to CARICOM would increase by approximately 129.5% while the amount shipped from the U.S. would increase by about 100% over current imported quantities. If the CET is doubled in the short-run, import quantities will decrease from all source countries, with the largest reduction in poultry imports from Brazil (85.7%), followed by the U.S. (65.9%), EU (38.3%), and Canada (4.7%). Similarly, in the long-run, poultry imports from Brazil (91%) and U.S. (64%) will decrease while poultry imports from Canada are projected to increase despite the doubling of the CET.

South America

Valdes et al. examine the costs, returns, and profitability of commercial poultry production in Brazil and the influence production efficiency had on poultry trade. Brazil leads the world in broiler meat exports and ranks third in overall poultry production. In 2014, Brazil exported 3.6 million tons of broiler meat, which accounts for 34% of the world's total broiler exports. While a number of studies have analyzed issues related to agricultural productivity improvements for major food crops like rice and wheat (Kamruzzaman et al. 2007; Coelli et al. 2002) only a few have focused on poultry meat farms (Areerat et al. 2012; Begum et al. 2010).

The authors' find that access to credit for poultry production helps increase the ability to use better quality inputs and services. Large flock size significantly reduces inefficiency as it helps derive economies of scale in input purchases and output sales. Findings from the study also reveal that the most integrated operations in the Center West and Southeast regions are the most efficient, with lower per-unit costs. Poultry enterprises in these regions might reap the benefits of an expanded domestic and export demand-led market. These findings are supported by USDA's 2014 Baseline, which expects Brazil's poultry meat exports to represent nearly 41 percent of global poultry trade over the next decade (USDA/OCE/WAOB 2014).

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