# Corporate Concentration in Global Meat Processing: The Role of Government Subsidies

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The world's largest meat processors have rapidly increased in size and power in recent decades. This chapter profiles the top three firms globally, JBS (Brazil), WH Group (China), and Tyson (USA). It also explores strategies these firms have used to achieve greater dominance, including acquiring close competitors, and enlisting strong government assistance. Government supports are numerous, but have included direct ownership stakes, production subsidies, low-interest funds to finance acquisitions, policies that shift the burden of environmental and community impacts of their operations to taxpayers, and regulatory barriers that disadvantage competing firms. The extensive scope of the largest firms increasingly allows them to scour the globe for the most favorable government supports, as well as to go around regulatory barriers. Governments and corporations attempt to legitimize these structural changes with rhetorical strategies (e.g. claims of efficiency and addressing hunger), and by obscuring the full costs of their actions, but may be approaching the limits of broad public acquiescence.

## Introduction

Like many other industries, the meat processing industry has become much more global, and ownership has concentrated dramatically in recent decades. The three largest firms globally are currently JBS of Brazil, WH Group of China and Tyson of USA. When their shares are aggregated in the US market they control 63% of pork packing, and just two (Tyson and JBS) control 46% of beef packing and 38% of poultry (Tyson Foods 2016)—institutional economists describe a market where four firms control 40% or more of sales as an oligopoly, or a shared monopoly (Howard 2016). In addition, these firms have concentrated markets not just (a) horizontally through acquiring direct competitors in their initial processing sectors (e.g. poultry), they also grew (b) concentrically by branching into the processing of other livestock species, and (c) vertically by taking over upstream suppliers (e.g. animal genetics, feed mills, feedlots) and downstream packaged/branded food manufacturers. By the end of 2015, for example, the largest global packaged food firms included Tyson at #2, JBS at #3 and WH Group at #14 (Cuneo 2016). They each control dozens of brand names, giving retail consumers the illusion that ownership remains quite diverse. Even more hidden from public view, however, they are reshaping a system that was previously characterized by a long series of stages/markets between farmers and consumers, each composed of numerous competitive firms. In its place, they are moving toward an increasingly "seamless system," with just a few firms controlling every aspect of production (Heffernan, Hendrickson, and Gronski 1999).

Government subsidies, both direct and indirect, have been crucial in supporting these trends. This chapter analyzes the role of government ownership stakes, production subsidies, low-interest funds to finance acquisitions, regulatory barriers that disadvantage competing firms, and policies that shift the burden of environmental and community impacts of their operations to taxpayers. These have greatly assisted the leading firms in overcoming previous limits to global dominance, both social and biophysical.

This chapter also explores the tensions between "legitimation and accumulation" (O'Connor 1973), as government efforts to assist the most dominant firms also threatens to undermine public support—not only for subsidies, but the authority of governments themselves. Political and economic changes in the meat processing sector, for example, have restructured societies in ways that have led to the loss of livelihoods of numerous smaller packagers, processors, farmers and breeders. In addition, they have resulted in negative impacts for public health, animal welfare and local and global ecosystems. Furthermore, they threaten the resilience of the food supply by locking in a highly centralized system that is increasingly vulnerable to potential disruptions, such as climate change and disease outbreaks. Both governments and dominant firms seek to justify these consequences through rhetorical strategies, and by efforts to obscure the full costs of their actions.

The next section reviews the literature on government subsidies and their role in facilitating global corporate concentration. This is followed by case studies of the three largest meat processors globally, with a focus on data from the most recent twenty-year period (1996 to 2016). The analysis compares the different strategies that national governments have used to fuel and rationalize the growth of these firms, as well as the role of these firms in garnering these supports. The concluding section then highlights the impacts of these trends, and the explores the likelihood that they will continue.

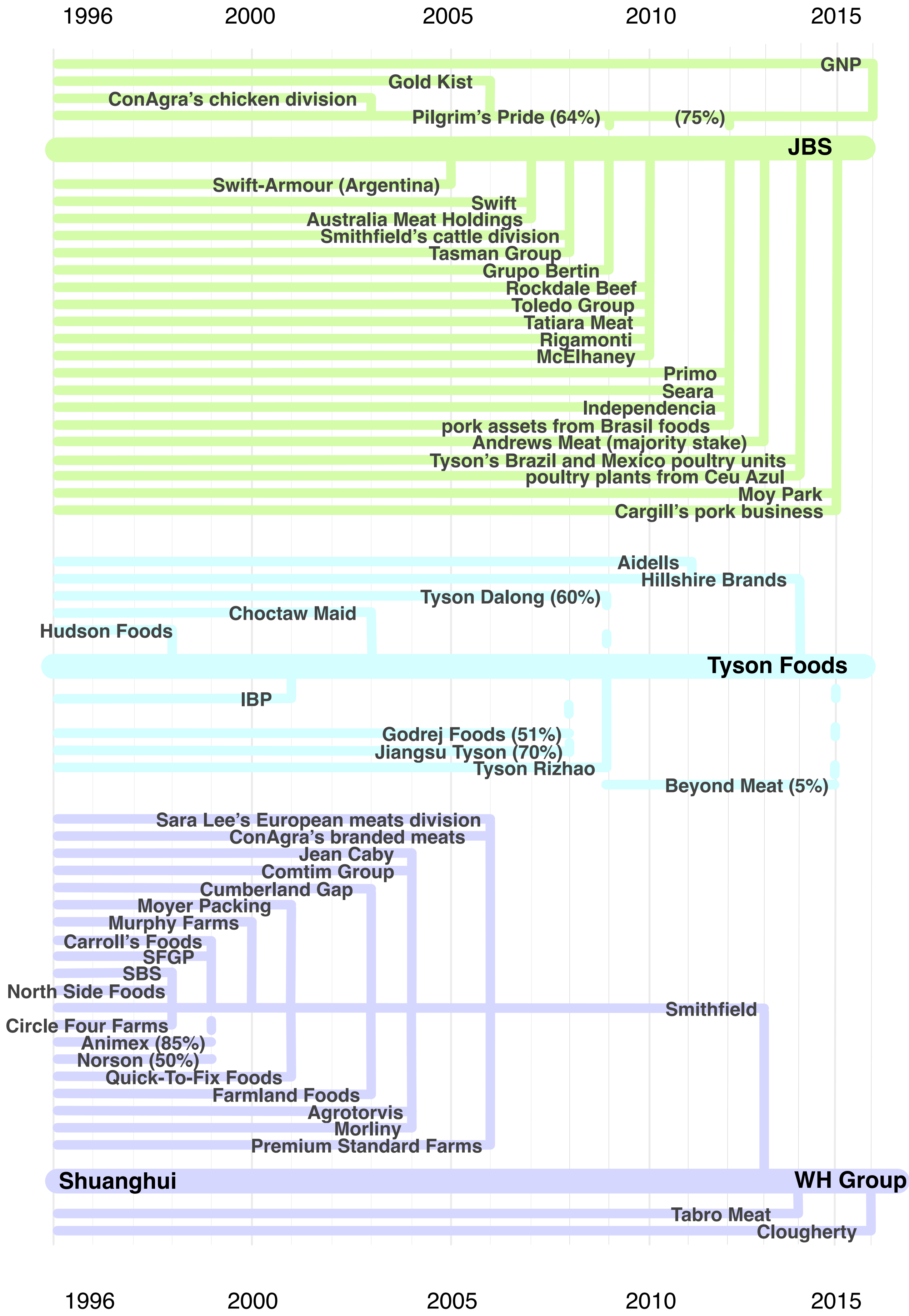
## Government subsidies and global concentration

Decision-makers in dominant firms are constantly seeking to increase their power of their organizations (Nitzan and Bichler 2009). If they do not, they are likely to lose investors and/or become vulnerable to takeover by other firms. Governments frequently assist these efforts (Baran and Sweezy 1966), as their policy changes are overwhelmingly shaped by elites (Bartels 2010; Schlozman, Verba, and Brady 2012; Gilens 2014). O’Connor (1973) described the challenges that governments face, however, as they negotiate tensions between helping dominant firms to accumulate more power, and a loss of legitimacy as this process negatively impacts the rest of society. Corporations increasingly recognize the importance of maintaining broad support for the political economic system, and are devoting more resources to public relations, funding for think tanks and endowed faculty positions, and other methods of reducing the potential for resistance (Boyd 2000).

Government subsidies often give dominant firms advantages over competitors, and even small gains can become magnified as the "rich get richer" (Barabási and Bonabeau 2003; Easley and Kleinberg 2010), thus reinforcing trends toward concentration. As leading firms have encountered limits to increasing power in their nations of origin, they have expanded globally in search of additional markets and cheaper inputs (Constance and Heffernan 1991). This greater scope provides even more advantages over competitors, as they are able to pit nation-states against each other, scouring the globe for the most favorable government supports, as well as to go around regulatory barriers (Bonanno and Constance 2010). The Brazilian meat processor JBS, for example, acquired a competitor named Moy Park in Northern Ireland 2015 (see Figure 1) and announced it would relocate its international business headquarters to the neighboring Republic of Ireland, which has a much lower tax rate than many nations. Interestingly, Moy Park was previously owned by another Brazilian firm (Marfrig), and the relocation plan was blocked by an arm of the Brazilian government because it held a significant ownership stake in JBS. As this example illustrates, a global scope also makes tensions between legitimation and accumulation more visible, as the governments that fostered the rise of these firms find it even more difficult to rationalize the benefits for their own bureaucracies, let alone the majority of their citizens.

Government subsidies have been essential, however, in overcoming both social and biophysical barriers to globalization. Social limits have been overcome through government actions that, for example, helped to give dominant firms advantages over competing firms (higher direct subsidies, barriers to entry, unequal enforcement of violations), reduced labor costs

**Leading Global Meat Processing Firms**
**Timeline of Ownership Changes, 1996 to 2016**



(lower rates of unionization, more government assistance to supplement below subsistence wages), and reshaped dietary patterns (increased consumption of meat and more highly processed meats). Biophysical limits have been overcome through actions that subsidized and artificially cheapened the costs for feed and for long-distance transportation, and increased the ability to produce livestock in more confined spaces (government-funded research for faster growth, reduced feed consumption, disease control, disposal of more concentrated wastes, etc.).

The industrial model was first developed for chickens, which are smaller and reach maturity faster than other key livestock species, but is now being applied to pork. Barriers to its application in beef systems are stronger, but are also slowly being dismantled (e.g. via growth promoters such as ractopamine). Significant differences in feed conversion efficiency persist, however, averaging 1.7 pounds of feed to produce a pound of body mass in chicken, compared to 2.9 pounds of feed for pork, and 6.8 pounds of feed for Hereford beef (Bourne 2014). This currently gives advantages to firms specializing in more feed-intensive species in favorable geographic regions, such as beef firms in Brazil, Argentina and Australia that make use of less expensive pasture for the majority of their cattle feed.

Not surprisingly, overcoming previous biophysical and social limits has resulted in substantial negative impacts, not only the intended effects of increasing social inequalities, but the collateral damage of additional human and environmental costs (Cochrane 2010). These "externalities," which are not typically calculated in economic analyses, include the loss of rural communities, the public health impacts of increased consumption of industrially-produced and highly processed meats, resource depletion, pollution, and the increased suffering of animals. Meat processors and government actions are increasingly delinking livestock production from its previous ties to nearby land resources (e.g. sources of feed), enabling tremendous spatial concentration (Naylor et al. 2005). One example of the increasing socioeconomic and environmental interactions between distant places is the exponential rise in shipments of soybeans from Brazil and the US to China for livestock consumption (Liu et al. 2013). This is not only a process of concentrating ownership and production, but a process of separating people from their means of production, and livestock from feed and nutrient cycles (Schneider 2017b). These actions to reshape society and ecosystems increase the "ecological hoofprint" of meat, and require constantly increasing the amounts of external inputs like energy, water, nutrients and chemicals (Weis 2013a, 2013b). In addition, these trends, which have also led to greater genetic uniformity of livestock, increase the risk of disease outbreaks in both animals and humans (Manning, Baines, and Chadd 2007).

These impacts are rationalized or obscured through rhetorical strategies, including direct statements from firms and government agencies, as well as proxies, such as trade associations, think tanks, astroturf groups, etc. (Hamerschlag, Lappe, and Malkan 2015). Some common themes include appeals to the "efficiency" of an increasingly centralized system, and the need to feed growing populations. The illusion of efficiency is reinforced by relatively cheap prices for consumers (Carolan 2014), but can only be maintained if subsidies and damages are ignored (Weis 2010; Weis 2013b). Claims of feeding hungry populations are similarly shaky, as the increasing throughput of industrialized systems does not address distributional issues, which are exacerbated by these trends (e.g. undermining informal food systems and displacing smaller, less resource-intensive producers) (Schneider 2014). What Fruedenberg (2005) calls "diversionary reframing" is also a common strategy, such as deflecting blame for recent outbreaks of avian influenza on wild birds, rather than large-scale confinement operations (Wallace 2017). Avian influenza and other diseases are impacting more industrialized operations while leaving smaller, outdoor operations less affected (Philpott 2015), however, making these claims even less tenable.

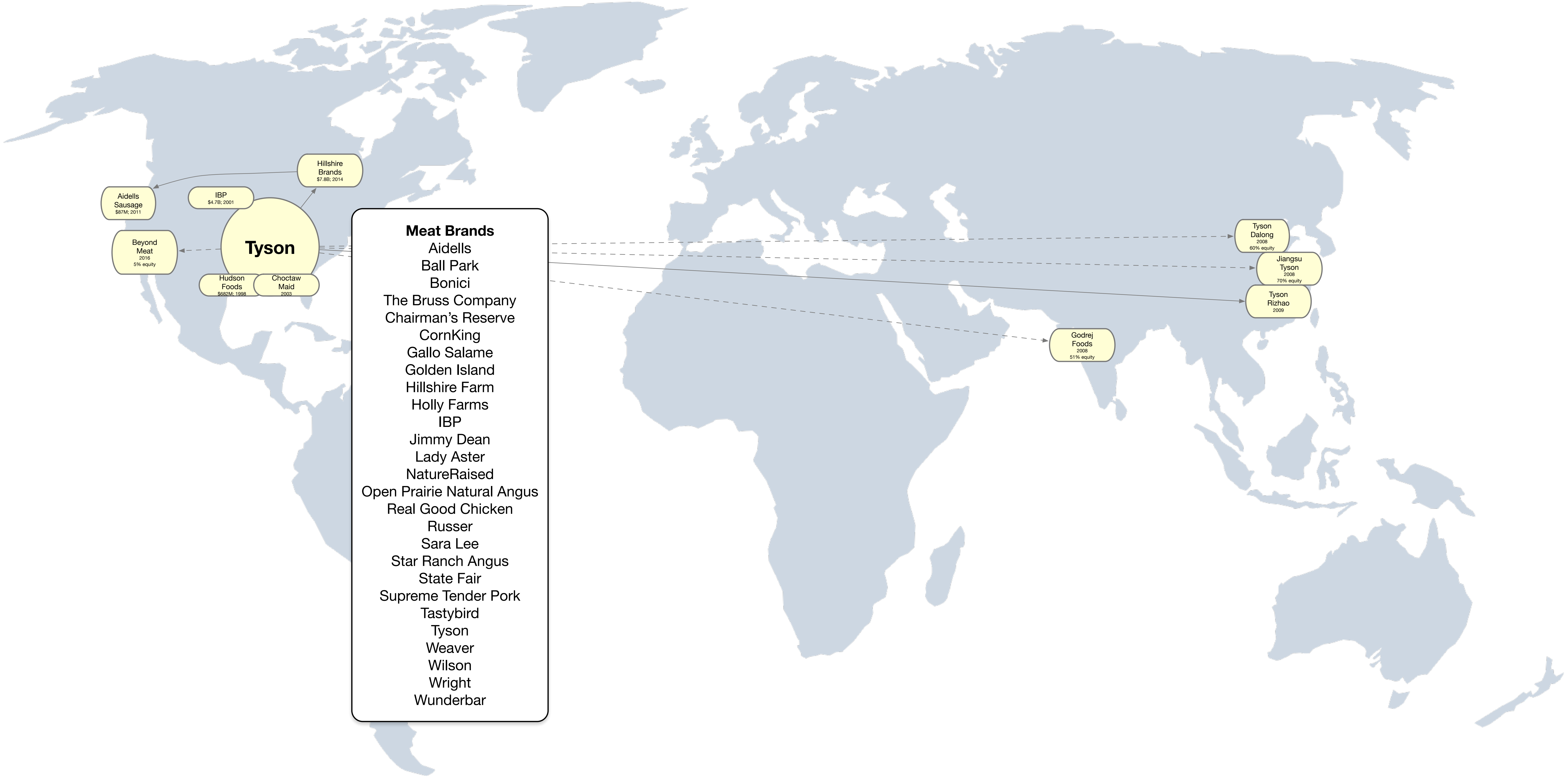
**Tyson**

Tyson Foods is the largest meat producer in the US. The publicly traded corporation is ranked first in processing of poultry and beef, with market shares of 21% and 24%, respectively. It is also ranked second in pork, with an 18% market share. Tyson was founded as a poultry firm in the 1930s by John W. Tyson, shortly before the industry began rapidly consolidating and vertically integrating. John's son Don Tyson convinced his father to emphasize a growth strategy, such as continually reinvesting revenues in expansion. In what is considered a low-margin industry, the firm was able to withstand market cycles better than its competitors, sometimes acquiring these firms when prices dropped (Leonard 2014). Another large meat processing firm, for example, Hudson, was acquired in 1998 at a relative bargain price of $682 million, due to an outbreak of *E. coli* that damaged its brand name. Even so, founder James Hudson's family received $515 million to exit the business (Warner 1997).

Tyson's corporate motto is "segment, concentrate, dominate" (Bonanno and Constance 2010, p. 132), and considered it important enough to file a trademark application on these three words in 1998. Its executives follow this motto by identifying narrow markets on which to focus their resources, increasing the firm's share of these markets to achieve the top ranking, and then selecting other segments to dominate. Figure 2 shows the location of acquisitions in the last two decades. In 2001, for instance, the firm acquired IBP for $4.7 billion, after winning a bidding war with Smithfield. This move helped Tyson to achieve a dominant market share in beef processing, and a temporary position as the world's largest meat producer and processor (Barboza and Sorkin 2001).

Tyson receives a diverse array of subsidies, but among the most important are those that

# Tyson
## Ownership Changes, 1996 to 2016



reduce the costs of feed, which is the largest expense in industrial meat production. Subsidies for feed enabled Tyson to save an estimated $288 million per year for its chicken division in an analysis of data from 1997 to 2005 (Starmer, Witteman, and Wise 2006). These calculations do not include the opportunity costs of growing government subsidized feeds, rather than other food crops for human consumption, which requires much less resources per calorie (Winders 2017). Tyson and other US meat processors have lobbied extensively to protect these subsidies, and have also lobbied against subsidies for ethanol, which have diverted feed crops for use as fuel, and increased the price of feed in recent years.

The meat industry may also receive government funding for producers when normal operations are disrupted. The poultry industry in the US, for example, received $700 million in government funds in the wake of an avian influenza outbreak in 2014 and 2015—over half a billion dollars were designated for control measures, and $190 million for payments to the growers who euthanized a total of 48 million birds (Greene 2015). These outbreaks are facilitated by highly concentrated production, which enables diseases to spread more easily, and the high degree of genetic uniformity of poultry. Tyson's subsidiary Cobb-Vantress supplies breeding stock for its operations, and it has acquired or partnered with a number of other poultry genetics firms in recent years (see Table 1). It is estimated that 95% of the world's commercial breeding stock for chickens produced for meat are now controlled by Tyson and two other firms: EW Group and Groupe Grimaud (IPES-Food 2017).

**Table 1. Ownership changes for Tyson's Cobb-Vantress subsidiary**

2007, acquisition of Hybro (from Hendrix), Netherlands, EU
2008, joint venture for R&D with Hendrix, Netherlands, EU
2008, acquisition of Avian Farms, Maine, USA
2008, partnership with Sasso, France, EU
2013, majority stake in Hubei Tong Xing, Hubei, China
2014, acquisition of Heritage Breeders (from Perdue), Missouri, USA

Other direct payments are in the form of government contracts to buy Tyson's products. In 2013, for example, the firm received $33 million from the USDA to purchase dark meat chicken for federal food nutrition programs, but with the primary purpose of stabilizing prices for the industry (*Talk Business* 2013). That year the firm made over three-quarters of a billion dollars in profit (Leonard 2014). Although its ties to the national government may appear weaker in comparison to JBS and the WH Group discussed below, it was a Tyson lawyer who helped Hillary Clinton turn a cattle futures investment of $1,000 into $100,000, and Tyson paid a $6 million fine for illegal gifts to Bill Clinton's Secretary of Agriculture, Mike Espy (Bendavid 1997).

Less visible subsidies can result from differential enforcement of government regulations. Larger firms may have more resources to fight legal actions, for example, but even if the playing field was even, their scale allows them to more easily pay penalties, and they may be more willing to violate laws as a result. Tyson was accused in 2016 of fixing prices for chicken, resulting in several class-action lawsuits. Evidence for this claim is that chicken prices had increased faster than other meats. An SEC investigation was subsequently opened to investigate claims that Tyson and other firms shared detailed production information to avoid excess supply, which allegedly resulted in consumers paying $3 billion more per year (Leonard 2017, McCoy 2017).

Don Tyson, who died in 2001 at age 80, was by that time a billionaire, and one of the 400 richest people in the US. Yet most the people employed directly by Tyson are no longer unionized, and receive extremely low wages. A sign in a Tyson processing plant in Arkansas states in both English and Spanish, "Democracies depend upon the political participation of its citizens, but not in the workplace" (Striffler 2002, p. 306). The firm also exploits the labor of farmers that supply poultry through the use of contracts. It uses a tournament system, which it pioneered, although has been adopted by other processors (as well as extended to the pork industry). In this system contract farmers are ranked against each other using non-transparent information, and their compensation is adjusted to reward high performers and punish low performers. Many variables such as the quality of feed and livestock are out of the control of the farmers (Domina and Taylor 2009). Although Tyson's power has increased substantially over time, the benefits have not trickled down to rural communities in which it operates. The journalist Christopher Leonard (2014) found that per capita income in the majority of the 79 counties where Tyson has facilities did not grow as fast as the state average.

Tyson's geographic expansion has focused on Asia through several joint ventures with firms in China and India, and some of these have been converted into full ownership. Here too, the firm receives subsidies from the national and provincial governments, including direct production supports and tax exemptions (Pi 2014). In China, Tyson maintains more direct ownership of farms and fewer contracts than in the US, partly due to lower wages for laborers. Key markets for its products in China include other large corporations, such as the grocery retailer Walmart (which also has global headquarters in Arkansas) and the fast food chain KFC. Tyson was one of many dominant firms that successfully advocated for Congress to repeal Country-of-Origin Labeling legislation in the US, which now enables it to sell meat produced or processed in other countries, without being required to provide consumers this information.

Tyson funds a number of organizations that attempt to put a positive spin on their increasing dominance, including the Center for Consumer Freedom, Center for Food Integrity, and the AgChat Foundation (Hamerschlag, Lappe, and Malkan 2015). The corporation's website touts their commitment to animal welfare, sustainability and charitable giving. Tyson also promotes its image with advertising, which is a tax-deductible expense.

### JBS

JBS is currently the world's largest meat processor. The firm is dominant globally in beef and poultry processing, but is ranked second in the US with market shares of 22% and 17%, respectively (Tyson Foods 2016). It is also ranked third in the US for pork processing, with a market share of 20% (ibid.). The firm was founded by José Batista Sobrinho in 1953 with a focus on slaughtering beef, and renamed after his initials in 2005 —it was initially called Friboi.

The firm's recent growth was greatly accelerated by access to low cost loans from Brazilian government, in exchange for becoming a shareholder. This reflects Brazil's "national champions" strategy, which resulted in government investments in some of its largest firms, and particularly in the meat sector, due to its world-leading position in exports of these products (Pigatto and Pigatto 2015)—other industries of focus included beer (Ambev/InBev), iron ore (Vale), telecommunications (Oi) and petroleum (Petrobras). Brazil's development bank, BNDES, acquired a stake in JBS in 2007, which currently accounts for 20.36% of shares, and another government owned bank, Caixa, has a 4.99% stake. The total government investment was once as high as 31.41% (Degan and Wong 2012), but is being reduced to avoid being affected by the nation's credit rating. BNDES also made smaller investments in the Brazil-based meat processor Marfrig, which enabled it to acquire firms in the US and UK (Pigatto and Pigatto 2015)—Marfrig is also ranked in the top ten in meat processing globally.

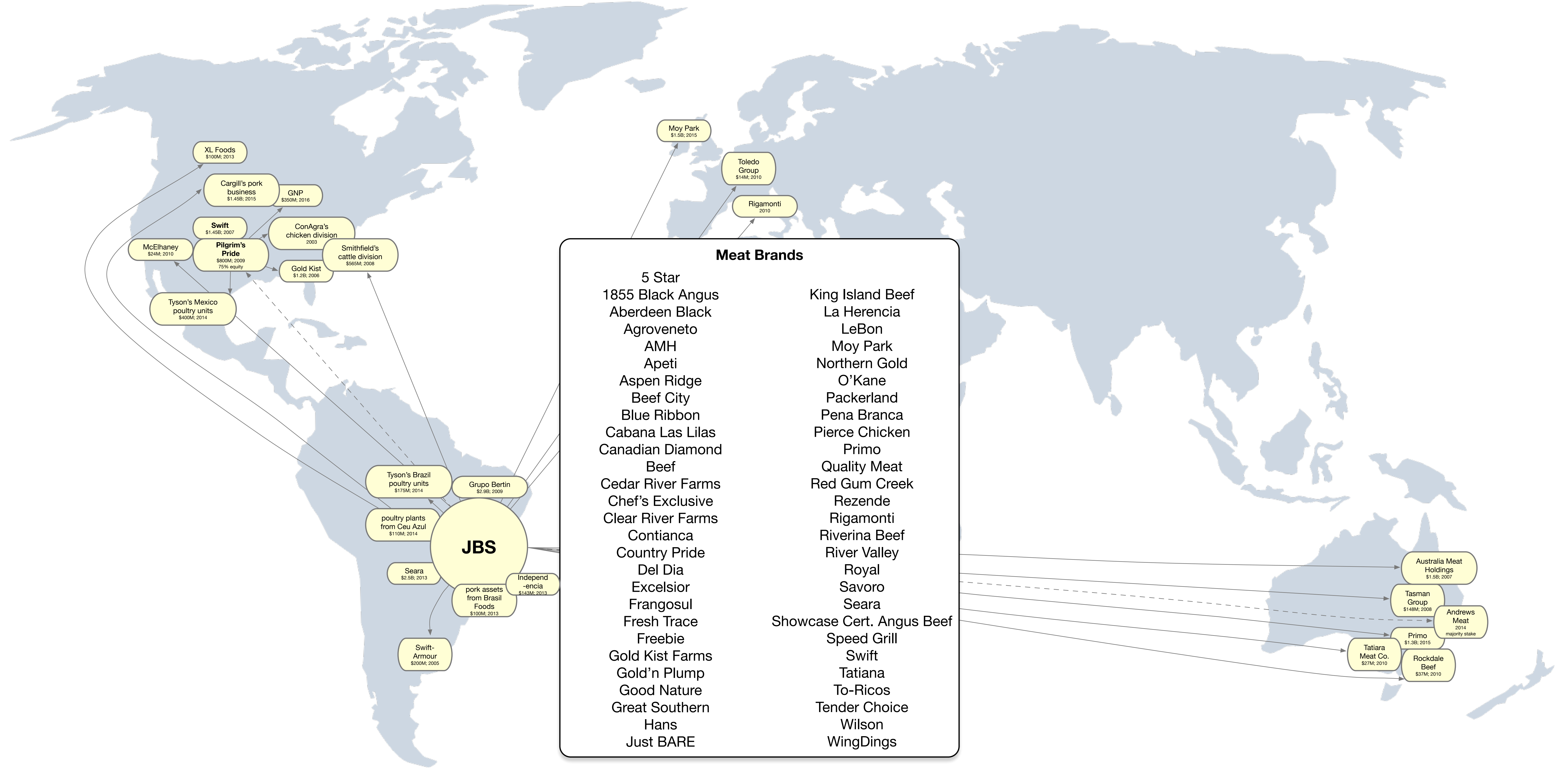
JBS has faced increasing criticism for receiving unfair advantages from the government of Brazil. In 2015, for example, it fell under investigation by the federal accounts court, questioning the "privileged treatment granted to the company," such as the speed with which loans by

BNDES were approved for very complicated and risky acquisitions (Clarke 2015). In 2016, two of the founder's sons, Wesley Batista and Joesley Batista, temporarily stepped down from their roles as CEO and chairman, respectively of JBS, due to being detained in an investigation of pension fund fraud, which targeted other firms held by the family (Magalhaes and Jelmayer 2017). Although state-run firms are not allowed to finance political campaigns, the government's minority stake allows JBS to spend more on candidates than any other firm in Brazil, including nearly a third of the members of the chamber of deputies.

Sergio Lazzarini, a professor of organization and strategy at a Brazilian university said, "The company has invested a lot in the management of the political interface," and "…would JBS have had this success without the support of state capital? Probably not" (Schmidt 2014). Joesley Batista admitted as much in 2017, after receiving immunity from criminal charges (resulting from an investigation of the alleged sale of tainted meat) in exchange for his testimony. Joesley disclosed payments of $220 million in bribes to thousands of politicians, and said that without these actions, the growth of JBS "…wouldn't have worked. It wouldn't have been so fast" (Freitas et al. 2017). The future growth of JBS is now threatened, as the firm was assessed a fine $3.1 billion for admitting to these bribes. It is in the process of selling off assets to pay this penalty, such as its Moy Park unit in the UK, and feedlots in the US and Canada. Nevertheless, five of six Batista's children hold investments in the company, and each of the five are now billionaires (Schmidt 2014).

Figure 3 shows major ownership changes involving JBS since 1996, totaling more than $20 billion. This included acquiring the much larger US firm Swift in 2007, which had become vulnerable to takeover due to declining profitability. Swift was itself the result of ConAgra acquiring Swift and Montfort, before eventually selling to a private equity firm Hicks, Muse &

# JBS Group
## Ownership Changes, 1996 to 2016




### Meat Brands

5 Star
1855 Black Angus
Aberdeen Black
Agroveneto
AMH
Apeti
Aspen Ridge
Beef City
Blue Ribbon
Cabana Las Lilas
Canadian Diamond Beef
Cedar River Farms
Chef's Exclusive
Clear River Farms
Contianca
Country Pride
Del Dia
Excelsior
Frangosul
Fresh Trace
Freebie
Gold Kist Farms
Gold'n Plump
Good Nature
Great Southern
Hans
Just BARE
King Island Beef
La Herencia
LeBon
Moy Park
Northern Gold
O'Kane
Packerland
Pena Branca
Pierce Chicken
Primo
Quality Meat
Red Gum Creek
Rezende
Rigamonti
Riverina Beef
River Valley
Royal
Savoro
Seara
Showcase Cert. Angus Beef
Speed Grill
Swift
Tatiana
To-Ricos
Tender Choice
Wilson
WingDings

Co. in 2002. Plans to quickly sell the business for a large profit were thwarted by the outbreak of bovine spongiform encephalopathy (BSE) in the UK, which led to the loss of export markets for US beef (Bell and Ross 2008).

In 2009 JBS acquired a majority stake in the poultry processor Pilgrim's Pride, which had previously acquired ConAgra's chicken division in 2003, and Gold Kist in 2006 (Gold Kist was formerly a producer cooperative that converted to a publicly traded corporation just two years prior). In 2012 JBS increased its stake in Pilgrim's Pride from 68% to 75.3%, by paying Bo Pilgrim $107.2 million for his shares in the company—Pilgrim was notorious for handing out $10,000 blank checks on the Texas Senate floor,
and for accounting irregularities to reduce tax liabilities (Richardson 2011). Just prior to this, JBS proposed to acquire the nation's fourth ranked beef processor, National Beef Packing. In a rare antitrust enforcement action, however, it was opposed by the US Department of Justice, due to concerns that the resulting market share would increase prices for consumers and lower prices for ranchers.

The corporation was allowed to make other significant acquisitions in the US, however, including Smithfield's beef business, and Cargill's pork business (for $1.45 billion). Even though Cargill is privately held, and therefore less subject to the short-term demands of investors in publicly-held corporations, firm executives decided to focus on grain trading and animal feed production where they held more dominant market shares. This move allowed JBS, however, to become even more dominant in meat processing. Tyson made a similar decision in 2014, selling their divisions in Mexico and Brazil to JBS for $575 million, rather than compete directly with a firm that had strong support from a Latin American government. Tyson had acquired three Brazilian firms in 2009, and established joint ventures in Mexico in the 1980s (Constance, Martinez, and Aboites 2010) before ceding these regions to its competitors.

JBS and its predecessor firms in the US have benefitted from controversial checkoff programs that were established in 1985. These programs require beef and pork (but not poultry) producers to pay funds for every animal they sell for meat, which are then used for research and promotion of the commodity. Although some small-scale producers have fought to dismantle these programs, they were designated as “government speech” by a 2005 Supreme Court decision. These producers charge that they are “paying for their own demise,” and that the funds have promoted the interests of larger-scale operations and processors. They support this claim with numerous examples, such as check-off funding for more than 100 studies designed to improve confined animal feed operations (which displaced 70% of US hog farmers from 1992 to 2009), and even payments used to spy on family farm organizations that criticized checkoffs (Howard 2016).

The global scope of JBS allows it to benefit from differing national regulations, as well as manage currency fluctuations (Degan and Wong 2012). One example is its use of an Australian subsidiary to export meat to the EU when Brazilian firms were restricted from doing so in 2008 (Blankfeld 2011). Some analysts suggest that moving its international operations to Ireland was motivated not by avoiding taxes (which would have been paid in the UK), but because “it would make it more difficult for any US cases against JBS or its executives to be enforced” (O’Donoghue 2016). JBS has also increased its currency speculation via hedging, recently spending twice what it earns per year just to pay interest on its derivatives positions (Freitas 2015).

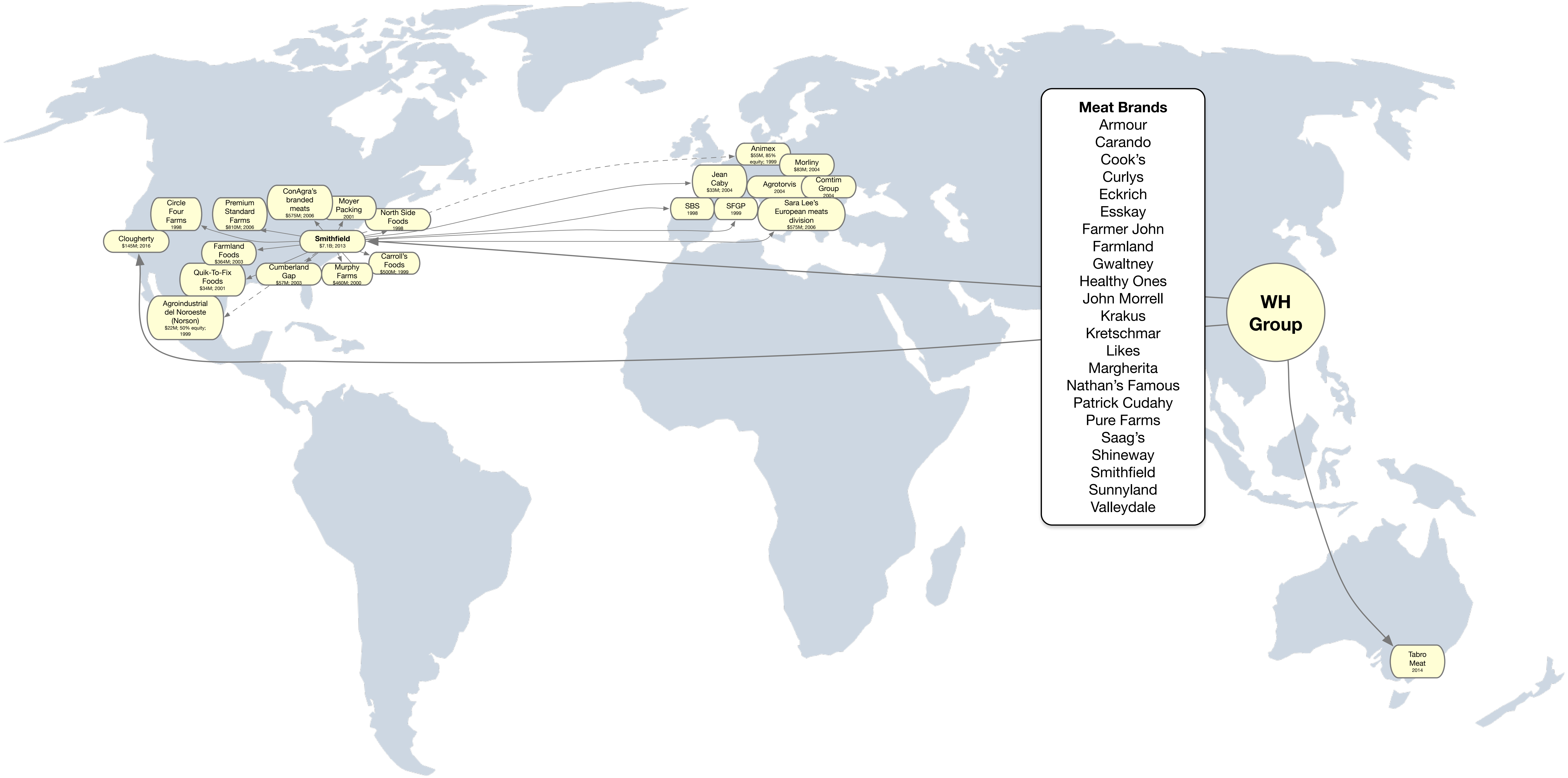
In the last three years the corporation has published reports that tout its social and environmental achievements, including claims that it takes measures to ensure suppliers are not destroying rainforests (JBS 2016). It is a member of the Round Table on Responsible Soy, which has standards for sourcing from producers that have not directly converted to soy production. This commitment, however, was only made after months of significant pressure from environmental groups, including Greenpeace. More recently the firm was accused of buying 59,000 cattle from illegally deforested regions of the Amazon (Maisonnave 2017).

**WH Group**

WH Group is the world's largest pork processor, and also dominant in US with a 25% market share (Tyson Foods 2016). The firm was started as a government-owned Luohe Slaughterhouse in the province of Henan in the late 1950s, but went bankrupt in 1984. It was then reorganized with the appointment of Wan Long to become general manager of the factory (Tao and Xie 2015). It was later renamed Shuanghui, and grew to become one of the leading pork firms in China, a nation that produces and consumes half of the world's pork (see Chapter 4). When Shuanghui acquired Smithfield in 2013, however, it was just half the size of the latter, as measured by sales. This resulted in the largest takeover of a US firm by a Chinese corporation, and Smithfield at that time held the title of the world's largest hog raiser and pork producer.

Shuanghui subsequently reorganized under the name WH Group. Like JBS, access to low interest financing from its national government played a key role in its ability to expand globally, and it has since made more acquisitions in the US, as well as Australia (Figure 4). It is planning further acquisitions with a goal of becoming world's largest packaged meats firm (Sito 2016). WH Group is rapidly expanding into poultry production, such as a joint venture with Nippon Ham Japan to supply technology for facilities in Henan province that will initially produce 50 million chickens per year (Pi 2014). The higher feed conversion efficiency of chickens will allow

# WH Group
## Ownership Changes, 1996 to 2016



the firm to produce more meat at a lower cost than their pig operations in China, although it will also require shifting strong cultural preferences for pork toward this alternative.

The WH Group benefited from Smithfield's aggressive acquisitions before its growth slowed and made the firm vulnerable to takeover. In addition to taking over a number of US competitors, Smithfield took advantage of Poland and Romania's admittance into the European Union in the early 2000s to privatize previously government-owned firms there. It also established front companies to acquire more farms to circumvent limits to foreign ownership (Public Citizen 2004). Smithfield was found to be violating numerous other laws, but the small fines were insignificant to the global corporation (Kennedy 2003). In Romania its expansion coincided with the loss of 90% of hog farmers (400,000 farms) in just four years (Carvajal and Castle 2009). Smithfield also received $40 million in loans from the Word Bank to expand its Norson joint venture in Mexico, just a few months before being acquired by the WH Group.

Smithfield is estimated to have saved $284 million per year for its hog division from 1997 to 2005, due to USDA subsidies for feed production (Starmer and Wise 2007). The USDA estimates it is currently cheaper to produce hogs in the US than China, with feed costs playing the largest role (Philpott 2013). Subsidies also go to pay for the disposal of highly concentrated animal waste from their operations. The USDA EQIP program, for example, distributes approximately $100 million per year to these producers—it was originally limited to smaller operations, but caps were lifted in 2002.

Numerous state and local governments have provided subsidies as well, particularly direct payments or tax incentives for new or expanded processing plants. They frequently compete to offer the largest incentive package, even though the jobs pay such low wages that most workers are immigrants from Latin America, Southeast Asia or Africa. This results in more indirect subsidies, through additional government spending on police, education, health care and other social services (Stull and Broadway 2013).

The Smithfield subsidiary immediately began exporting cheaper US-raised pork to China after it was acquired by WH Group. Imports in China have increased significantly since 2007 when it became a net pork importer, and reached a record high in early 2016 (Gale 2017). One limiting factor is the lack of sufficient arable land for feed crops to supply industrial pork farms, and China has increased its imports of corn and soybeans in an attempt to overcome these limits (Schneider 2011; Peine 2013). Another is the environmental impacts of existing operations, such as 16,000 dead pigs that were found dumped into the Huangpu River in 2013, after a crack-down on sales of dead meat—the animals were affected by porcine circovirus (Davison 2013). Incidents like these have resulted in increasing restrictions on production near rivers and more affluent areas, and contributed to insufficient domestic supplies to meet the growing demand for pork. A 2011 national government directive detailed a five-year plan to acquire foreign businesses to help address this issue, which justified providing Shuanghui/WH Group the resources to acquire a larger US firm (Halverson 2015).

The Bank of China provided a $4 billion loan for this acquisition, and approved it in just one day. Larry Pope, CEO of Smithfield, after being shown the documents detailing this move, said, "Wow. I don't think I could go out today and get the U.S. government to support making a $4 billion loan as a social responsibility for Smithfield to move forward on a foreign — on a foreign country's territory. No, I don't think that's doable in any industry that I can think of " (Woodruff 2014). Pope was expected to receive $46.4 million in compensation upon the sale of the corporation, which came as Smithfield was under criticism for its high level of executive compensation, and poor performance relative to other in food industries (Smith 2014). Wan Long remains head of the WH Group, and paid himself a $460 million bonus after acquiring Smithfield (Halverson 2015), making him a billionaire—he is now one of the 400 wealthiest people in China.

The Chinese government has rationalized the growth of WH Group and other large meat processors with rhetoric of efficiency and rural development (Schneider 2017a). Following the US industrial model, government policies specifically encourage economic and geographic concentration by designating "dragon head" enterprises—the term refers to dragon dancers in parades, and the importance of the person who wears the head of the creature for those who follow in line as its body. This leadership role has been assigned to select firms in a number of agribusiness industries (e.g. COFCO for grain trading, New Hope Group for animal feed) to facilitate increasing the scale of production, as well as more vertically integrated supply chains. Dragon head meat processing firms are technically obligated to contract with household-level producers to address rural development goals, but frequently inflate these numbers, and instead work with larger-scale producers (Schneider 2017a). These policies have been effective in dramatically transforming the pork sector in China, reducing smallholder producers from 74% of pig production in 2000 to less than 37% just a decade later (Schneider with Sharma 2014).

Efficiency claims are undermined by the scale of government subsidies for dragon head firms, which include "direct payments, tax exemptions and reductions, export tax rebates, discount loans for export-oriented products, and access to special loans with little or no interest" (Schneider 2017a, pp. 8-9). For pork, an additional subsidy is a strategic pork reserve operated by the central government, which buys excess supplies when prices decline and releases them when prices increase to achieve stability. Yet another significant subsidy at the production stage is the construction of government-owned, larger-scale pig barns, which are either leased to farmers, or operated by wage workers hired by the local government to raise pigs (Schneider 2017b). In 2012, pork subsidies in China totaled an estimated $22 billion, or $47 per pig (*Economist* 2014).

These actions by the government of China contribute to increasing pork consumption, particularly for its more affluent citizens, which aids in its legitimation (Schneider 2014). This is an example of a process that Weis (2013b) describes globally as "meatification," and is spurring increased consumption of meat in other less industrialized nations such as Brazil, Russia and South Africa. The ecological, social and human health impacts of these trends are downplayed by both the WH Group and the government of China. Smithfield's slogan, for example, is "Good food. Responsibly" (which is a registered trademark). The corporation has an annual sustainability report that highlights its initiatives in animal welfare, the environment and food safety. Its parent corporation, however, is not part of the Round Table on Responsible Soy, and the government of China has not encouraged any firms headquartered in the nation to participate in this organization (*Economist* 2014).

## Conclusion

Differential government supports have helped shape the winners and losers among meat processing firms. Access to low cost financing for acquisitions shaped the rapid rise of both JBS and WH Group, with their respective emphasis on beef and pork in their countries of origin, which enabled them to take over much larger competitors worldwide. This is a risky strategy, requiring high levels of debt, but the increased power that resulted for both firms has helped them to reduce these debts, and plan for even more acquisitions. European meat processors, in contrast, have lost power globally due to the costs of complying with traceability regulations

(Hansen and Hoenen 2016)—although even within the EU differing regulations have resulted in Poland and Germany's firms faring better than France's (Manning, Baines, and Chadd 2007).

Tyson's ability to remain a global player was shaped by its initial focus on poultry, which was more efficient in conversion of US government subsidized feed relative to pork and beef packers. In an increasingly global industry, however, Tyson's focus on more limited geographic regions may result in vulnerability to takeover, much like meat processing firms that have already been acquired by JBS and WH Group in the United States (and the EU and Australia). In the beer industry, for example, Anheuser-Busch was acquired in a hostile takeover by the Brazilian-led/Belgium-headquartered InBev, due to the previous CEO's unwillingness to acquire global competitors (MacIntosh 2011)—this industry is now approaching global domination by just one firm after InBev's acquisition of SABMiller in 2016. Barriers to expanding Tyson's presence in China may play a role in constraining the corporation to slower growing markets (e.g. those with declining meat consumption), which would disadvantage it even more relative to JBS and WH Group.

The scope of government subsidies provided to Tyson, JBS and WH Group suggests that without these supports the global meat industry would be far less concentrated in ownership, and the top executives of all of these firms would not be billionaires (nor would executives of firms that were acquired in recent decades have received tens or hundreds of millions of dollars). In addition, the meatification of diets might not have proceeded as extensively, meat production would be less geographically concentrated, and livestock and feed crops would be less genetically uniform. Therefore, the problems posed by these trends, including the increased likelihood of outbreaks of disease in humans, livestock and feed crops, would not be as substantial as they are now. Government and industry efforts are creating path dependencies or lock-ins for this type of system that will make it more difficult to address these negative consequences, such as by decentralizing and diversifying production (IPES-Food 2016). Some of these lock-ins include the loss of heritage breeds, the decline small producers and their knowledge, and the disappearance of smaller processors and their infrastructure.

Government and corporate efforts to legitimize these trends and to conceal their negative impacts are facing greater resistance, however. This has motivated governments to block a few proposed acquisitions or relocations, and even to open criminal investigations in rare cases. In addition, increasing consumer pressure has resulted in promises by the leading firms to phase-out some practices that threaten human health (e.g. certain antibiotics, growth promoters like ractopamine) or raise animal welfare concerns (e.g. gestation crates for pork). New communication tools have raised awareness of the problems a globally concentrating meat industry, and enhanced the efficacy of collective action strategies. This is occurring at a time when global climate change and dwindling natural resources, such as fossil fuels and key fertilizers, pose greater challenges to further concentration. The strategies of the largest firms are therefore vulnerable not just to differential support from governments, but the biophysical and social limits they are increasingly pushing up against.

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