

Chapter 17: Post-Farmgate Employment in the U.S.

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Agricultural crops and animals are processed into foods, beverages, feeds, fuels, fibers, nutritional supplements, and pharmaceuticals. Over time, as with all manufacturing sectors, there have been shifts in the prominence of different food processing subsectors, their labor needs, the locations of production facilities, technological reliance, and the structure of those industries in their relationships to suppliers (farms) and to buyers (ultimately, individual consumers). This chapter describes changes in the nation's food processing sectors over the past 50 years, focusing on three key dimensions: (1) trends and characteristics of the food sector's overall labor demand and supply, (2) selected structural and organizational changes in industries processing agricultural goods, and (3) the roles of selected technological change in terms of labor demanded and kinds of food and kindred goods produced.

17.1 Introduction

Food production in the United States involves a rich and intricate set of industrial activities, beginning with production agriculture and aquaculture; transportation and distribution intermediaries; processing by manufacturers of the original farm or fish commodities as delivered; the transformation of initial processing into consumer foods, beverages, animal feeds, or other goods; and ending with the distribution of manufactured products to wholesalers, food stores, restaurants, and institutions.

The relationship between farm-produced goods and the nation's manufacturing sector is continually evolving to satisfy consumer food and convenience demands and to take advantage of other profitable, often-times nonfood, production possibilities. For example, additional

processing of grain and oilseed products yields a range of organic chemicals and byproducts that can be used to make paper, textiles, adhesives, plastics, solvents, and textiles, to name a few.

Some agricultural commodities now have substantial nonfood uses. Between 2000 and 2010, for example, there was strong growth in the fraction of the nation's corn supply used to produce ethanol. The same can be said, but at lower quantities, in the conversion of oilseeds to biodiesel fuels. In 2017, ethanol production accounted for 30% of all uses of corn – up from 10.7% in 2004 [Economic Research Service (ERS), 2017], and biodiesel production used 33% of the nation's soybean oil in 2017 – up from less than 3% in 2004 [ERS, 2018].

There are functional distinctions regarding the relationships among agriculture, manufacturing, other sectors of the economy, and consumers [Marion, 1986]. The bulk of farm-produced commodities is sold directly or through intermediaries to, typically, large and capital-intensive initial processors: animal slaughtering facilities, grain millers, oilseed crushers, fluid milk facilities, and vegetable and fruit canneries and freezing operations, as examples. A sizeable share of these initially processed goods finds its way directly to consumers without further processing, as is the case with fluid milk or fresh, canned, or frozen fruits and vegetables, but a much larger share becomes inputs into subsequent manufacturing or service-providing industries like restaurants. Overall, most of the initial processing of farm commodities create *producer* goods. Producer goods are the ingredients used, after additional processing, to make finished *consumer* food and kindred products that are sold by food stores and by the food service industry.

A rudimentary comparison of the size of the food and kindred sectors that produce primarily as inputs suppliers to those that produce, ultimately, for household consumption can be gleaned from the 2016 Annual Survey of Manufacturers in the U.S. [Department of Commerce, 2017]. Manufacturers primarily engaged in the initial processing of raw agricultural commodities to be used as inputs into other food manufacturing activities had 35% of the value of manufacturing shipments and 35% of all employees in food, beverage, and tobacco manufacturing. This initial processing is closer to the farm economy, so nearly two-thirds of the nation's food-related manufacturing sales and workers were at least

one more step removed from the nation's agricultural sector. Moreover, while the consumer-oriented manufacturing component had 65% of both final sales and manufacturing workers, it commanded nearly 74% of the added value generated in the food processing sector. This higher value-added proportion is explained by higher wages paid in the sectors producing primarily for consumer use and, secondarily, by higher profits.

17.2 Trends in food industry employment

Employment in the U.S. food, beverage, and tobacco industries has varied over the years. Regional employment, too, has evolved. Early in the last century, major meatpacking facilities were located in large cities that were labor, transportation, and animal supply hubs. The most famous example is Chicago, which dominated the nation in animal slaughter and the production of dressed, canned, and packed meat products from the Civil War up to the Great Depression. As the western areas of the U.S. developed, branch plants were subsequently located in Kansas City, Omaha, Sioux City, Sioux Falls, Wichita, Fort Worth, and Denver, to name a few [Wade, 2005]. Eighty or so years later, comparatively little meatpacking activity is left in those historical centers. The industry decentralized in large part during the 1970s and 1980s, and moved to smaller cities that were closer to the pork, beef, and poultry farms.

Examples of industrial concentration and redistribution abound in other areas of food production and processing. Sectors such as vegetable and fruit production were widely distributed historically but became regionally concentrated as comparative production advantages were capitalized on over time. According to the 2012 Census of Agriculture, just 10 states accounted for 76% of U.S. vegetable sales that year [ERS, 2012]. Many states supporting jobs in vegetable canneries or sustained regional fruit and berry production and processing cooperatives as late as the 1980s had lost many of those firms by the turn of the 21st century.

The food processing industry is ever-changing, but a constant factor is labor. Nearly all agricultural commodities require substantial processing labor before the crop or livestock becomes a food, feed, beverage, fiber or other good. Food production in general is classified broadly by

government agencies as *food and kindred* products manufacturing and as *beverage and tobacco* manufacturing. The majority of employment that processes agricultural grains, oil seeds, fruits, vegetables, melons, berries, and animals is found in those two subsectors of nondurable goods manufacturing. Ancillary and related employment is also found in sectors that manufacture pre-processed agricultural commodities, genetically engineered crops, or food production byproducts into “antibodies, vaccines, enzymes, and other pharmaceutical proteins” [Graff and Moschini, 2004], as well as distilled into organic chemicals such as ethanol, which is used primarily as a motor fuel supplement.

Manufacturing jobs in the U.S. have eroded over the decades, but food production jobs have remained somewhat more stable. In 1970, 9.6% of all manufacturing jobs were in food and kindred plus tobacco manufacturing. By 2016, that fraction had grown to 14.5% (Table 17.1). Though a larger and growing component of all manufacturing jobs, in 1970 just under 1 out of 50 U.S. jobs was in food and related product processing, but by 2016 that ratio was 1 out of 100.

Total manufacturing jobs in the U.S. were one-third smaller than in 1970, but food industry jobs were, in contrast, slightly larger than in 1970. Overall, due to population growth and food production efficiencies, the U.S. had 923 food processing workers per 100,000 persons in 1970, but by 2010 that number was reduced to 545. Jobs in the industry have recovered somewhat this decade, and that ratio has grown to 589 jobs per 100,000 persons.

Table 17.1 Characteristics of Food and Related Manufacturing Jobs,
1970 to 2016

	1970	1990	2010	2016
As a percentage of all manufacturing jobs	9.6%	8.8%	13.9%	14.5%
As a percentage of all U.S. jobs	2.1%	1.2%	1.0%	1.0%
Indexed job change (1970=100):				
All manufacturing	100.0	99.9	61.5	66.6
Food and related manufacturing	100.0	91.7	89.7	101.3
Jobs per 100,000 U.S. population	923	691	545	589

Source: Regional Economic Accounts, U.S. Bureau of Economic Analysis.

Growth in the number of food and related manufacturing establishments has also shown some interesting patterns of change (Table 17.2). Establishments producing food and animal feeds realized only modest growth between 1980 and 1990 but expanded greatly during the 1990s. Beverage manufacturing establishments declined during the 1980s, recovered in the 1990s, and then grew exponentially during the current decade. Tobacco manufacturers declined persistently through 2000 but have increased in the current decade.

Table 17.2 Food Establishments in the United States, 1980 to 2016

	1980	1990	2000	2016
Food and animal feed	18,148	18,600	26,401	27,138
Beverages	2,641	2,035	2,748	8,319
Tobacco	194	143	121	146
Total	20,983	20,778	29,270	35,603

Source: County Business Patterns, U.S. Department of Commerce, various years.

As just noted, significant job growth this decade is found in the beverage industry. According to U.S. Bureau of Labor Statistics compilations, employment in breweries doubled between 2010 and 2016, winery jobs grew by 48%, and distillery jobs were up by 68%. Nearly all the growth was a result of the redistribution of those sectors across the states into micro-breweries, small wineries, and micro-distilleries.

Growth rates in the number of adult beverage manufacturing establishments were much greater than job growth, as Table 17.3 reveals. Winery establishments with payroll employees grew by 283%, breweries by 618%, and distilleries 923%. Sole proprietors and simple partnerships without employees are not counted in this compilation, so the actual expansion in these subsectors is even greater than indicated.

Table 17.3 Recent Establishment Growth in Breweries, Wineries, and Distilleries

	2001	2010	2016	Percentage Change 2001-2016
Breweries	396	527	2,843	618%
Wineries	1,066	2,626	4,083	283%
Distilleries	66	145	675	923%

Source: Quarterly Census of Employment and Wages, U.S. Bureau of Labor Statistics

Although employment in food processing sectors has been stable compared to all manufacturing, employee compensation among food processing workers has lost ground when compared to the average manufacturing worker and to the average nonfarm jobholder. In 1970, the average food manufacturing worker made 93% of that of an average manufacturing worker annually and 121% of what an average nonfarm worker made (Table 17.4). There were some ups and downs in those ratios over the decades, but by 2016 the relative earnings situation of food industry workers had deteriorated. They made per job 107% of the nonfarm average and a much-reduced 73% of that of the typical manufacturing worker.

There have been real wage gains in the broader food manufacturing sector, but recently they have lagged other manufacturing sectors. Between 2010 and 2016, average real manufacturing worker pay grew by 50% compared with 7.5% for those in the food processing sector.

Table 17.4 Real Wages and Salaries Per Job in Food and Related Manufacturing, 1970 through 2016: Selected Industrial Comparisons

	1970	1990	2010	2016
Wages & salaries in constant 2016 dollars				
All nonfarm	\$30,776	\$33,033	\$42,641	\$42,162
Manufacturing	39,925	46,951	41,387	62,154
Food, beverage, & tobacco	37,163	41,326	42,106	45,261

As a percentage of all manufacturing jobs	93%	88%	102%	73%
As a percentage of all nonfarm jobs	121%	125%	99%	107%

Source: Regional Economic Accounts, Bureau of Labor Statistics. Wages deflated using the Bureau of Economic Analysis implicit price deflator for personal consumption expenditures.

It is instructive to look at the spatial shift in demand for food industry labor over time using the Bureau of Economic Analysis’s eight regional designations (Table 17.5). Even though the region is growing in population, the Mideast saw its shares of food manufacturing jobs decline by over 7 percentage points comparing 2016 with a base year of 1970. The Southeast saw its shares grow by 4.3 percentage points, with slightly less growth in the Far West over that same time period. Meaningful growth also was realized in the Southwest, while substantial erosions in their employment shares also were found among the Great Lakes states.

Table 17.5 Employment by Region as Percentages of All Food and Related Manufacturing Jobs, 1970 to 2016

	1970	1990	2010	2016
New England	4.1%	2.8%	3.1%	3.3%
Mideast	19.9%	14.4%	12.5%	12.1%
Great Lakes	20.8%	18.0%	17.5%	17.8%
Plains	12.3%	12.9%	14.1%	13.7%
Southeast	20.2%	24.2%	25.8%	24.5%
Southwest	6.4%	7.7%	8.3%	8.5%
Rocky Mountain	2.9%	3.5%	3.4%	3.9%
Far West	13.5%	16.4%	15.3%	16.2%

Source: Regional Economic Accounts: State Annual Personal Income and Employment, Bureau of Economic Analysis.

17.3 Food and Related Industry Transformations

Farm product processing in the United States is ever-evolving. Technological advances continually change the manufacturing work environment and create new food-based production inputs and consumer products. Over time, too, dominant industrial processes change, radically altering the balance of market power in an industry, as was the case in the beef and pork packing industries in the 1970s and 1980s. Finally, due in part to the previous two factors, the role of organized labor in the food processing industries, as in nearly all manufacturing sectors, has waned.

The food production industry has a complex relationship with upstream farming and commodity origination sectors as well as downstream relationships with distributors and retailers. Consequently, there are examples of vertical integration, as is the case in the poultry industry, where poultry processors have contracts with producers or own or otherwise control the farm production of poultry [Vukina, 2001]. These types of processor-producer relationships became much more widespread in the pork industry in the 1990s and 2000s [Lawrence *et al.*, 1997]. Within similar industry types, there are also many instances of horizontal integration, as was the case in 2015 when Heinz and Kraft Foods merged into one dominant manufacturer of processed food products. The same is the case in beer manufacturing. Over time, AB InBev (which owns Budweiser) and MillerCoors acquired substantial market power and could claim three-quarters of all beer sales by 2011 (Howard and Ogilvie, 2011).

A good example of structural, process, and labor changes that radically altered a food manufacturing sector was the ascension and eventual dominance of Iowa Beef Processors (IBP) during the 1970s and the 1980s in the Midwest. Originally founded as Iowa Beef Packers, IBP created a production and marketing structure that upended the industry and, over a comparatively short period of time, drove many famous-name meatpacking companies into bankruptcy.

While a savvy, aggressive, and even underhanded firm across a wide array of fronts, IBP gained prominence in the meatpacking industry through several key market-shaping features. Its initial innovation was to scale up the production of boxed beef and send those choice components to grocers, restaurants, and other institutional users that then processed the

meat for consumers. IBP was able to accomplish three things with its overall approach to meat processing: (1) it located plants amid animal supplies, thus allowing for higher bid prices than would have been possible for packers located at more distant regional processing centers like Omaha, Kansas City, Chicago, or Minneapolis; (2) it realized lower shipping costs because the boxed beef was significantly deboned and weighed less than shipping a whole carcass; and (3) it effectively “deskilled” the meatpacking labor process, which over time allowed IBP to drive down the price of labor [Fink, 1998].

Historically, much of the meatpacking industry labor was organized into the United Packinghouse Workers of America, which later became the United Food and Commercial Workers International Union. Most meatpackers were considered skilled butchers who could perform a range of processing activities as production required. All workers received the same level of compensation across all unionized firms under what was called a “master contract,” and the compensation was considered competitive with that of other skilled manufacturing jobs. Packinghouse jobs were good jobs.

IBP, however, used a faster processing line that employed workers doing the same repetitive action on the line. They were not required to be butchers, but to be trainable to handle a specialized task. That is how the job of meatpacking was, in effect, deskilled: according to Lauck [1998], IBP boxed beef facilities paid workers about 17% less than workers in facilities with master contracts in 1981.

Over a comparatively short period of time, the IBP model, along with other factors, including changes in consumer meat preferences, resulted in significant reductions in the number of firms processing meat products. Between 1980 and 2000, the number of U.S. beef slaughter plants went from 600 to 170, and the number of hog slaughter plants went from 500 to 180 [Barkema *et al.*, 2001].

The changes in the processes of meat product manufacturing and the prevailing pay also transformed the workforce of meatpacking. Meatpacking jobs have always been hard and dangerous, and historically those jobs were filled, especially in large cities like Chicago, by recent immigrants from Europe. As the industry regionalized after the first quarter of the 20th century, the jobs were filled by area residents who were

predominantly white, often unionized, and socially and culturally mainstream.

The likelihood of union representation declined strongly during the 1980s, culminating dramatically in the Hormel strike in 1985 and 1986 in Austin, Minn. Local P-9 of the United Food and Commercial Workers union found itself clashing not only with Hormel but also with its parent union, which had adopted a much more conciliatory stance regarding pay, benefits, and conditions of work negotiations during this time of widespread plant closings. Despite a long-term existing pay freeze at the pork processing plant, Hormel demanded reductions in hourly pay from \$10.69 to \$8.25 coupled with faster processing line requirements. The 10-month strike resulted in violence and the deployment of the Minnesota National Guard. When the local union refused to give in, the parent union placed the union into receivership and acceded to the company's demands [Brown, 2015].

As ultimately happened at Hormel, as it had in dozens of other plants across the Midwest and the Plains states, reduced hourly pay coupled with increased processing line speeds resulted in a decline in existing local residents' desire to work at the nation's meat processing facilities. Within a few years, the industry came to rely on Latino, Asian, east European, and later, African immigrants, many of whom were not authorized to be in the country [Barboza, 2001; Kandel and Parrado, 2005].

Using 2011 – 2015 data from the American Community Survey, a recent analysis concluded that 63% of butchers and other meat, poultry, and fish processing jobholders in the U.S. currently are foreign-born [New American Economy, 2017]. Further, as beef and pork processing plants relocated over the decades primarily to smaller communities closer to animal supplies, those communities had become more ethnically and culturally diverse, but many also attained economic resilience that other rural communities could not replicate [Cohen, 2017].

There are other notable transformations in the nation's food processing system. First, consumer preferences have altered household food demands. In the 1970s, beef was the dominant meat choice, followed by pork and chicken. By 1996 chicken had overtaken pork, and it had overtaken beef by 2010 [ERS, 2016]. This, of course, affects employment in both animal production and in processing. The sharp rise in chicken

consumption aligns, therefore, with food processing employment growth in the U.S. Southeast, where that industry is concentrated.

Further, there were significant changes in consumer demand over the decades for both fresh and processed food products based on: (1) nutritional awareness; (2) health and lifestyle changes, including many more women participating in the labor force, which in turn boosted the demand and the production of more ready-to-eat types of meals; and (3) demographic changes that affect where food production employment has shifted, both in terms of the nation's demographic makeup as well as where the U.S. is growing more rapidly [Barkema, 1991].

During the 2000s, the nation's corn ethanol industry expanded rapidly. The majority of that growth occurred in the Corn Belt, and the nation's ethanol production capacity tripled between 2005 and 2010. While corn-based ethanol is denatured and not used as a beverage, the distilled grains resulting from the brewing process are valuable, high-protein animal feeds. As one-third of the corn mass used to produce ethanol results in animal feed, that industry's employment contribution to food and feed production is now substantial.

Nutritional supplements also are extracted from other corn and oilseed processing structures. The massive wet corn mills in the Midwest can produce sweeteners, starches, animal feeds, and food supplements such as amino acids.

Other comparatively recent innovations involve technologies that can extract more food products from conventional processing. Lean finely textured meat products for human consumption are now produced from the meat processing byproduct stream that conventionally went into animal feeds. Many of these processing advances and innovations mean that a different type of worker is needed in some aspects of food and nutritional products manufacturing – workers who are technologically trained in production systems that are highly automated instead of manual laborers.

17.4 Emerging Food Industry Labor Concerns

Two dimensions warrant scrutiny regarding the nation's food processing industries. The first is worker safety, and the second is the overall labor supply.

According to the Bureau of Labor Statistics, the food manufacturing industry consistently accounts for the largest number of workplace fatalities, and that rate rose consistently through the 2000s. The likelihood of musculoskeletal disorders is high. These include back pain, sprains and strains, hernias, and carpal tunnel syndrome. The causes of these disorders are overexertion, repetitive motion, and bending or other actions that stress joints and tissues [Bhushan, 2011].

There are frequent media reports about the inherent dangers of food processing employment [Lowe, 2016; GAO 2005]. Among some sectors of the industry there are also problems with persistent high turnover. This high turnover results from stress, strain, and injury; from comparatively low pay; from high output demands per worker; and from the general working conditions that exist in some industries. Meat, poultry, and seafood processing workers have higher turnover rates than workers in other food and feed producing industries, and retaining plant workforces is an ongoing problem [GAO, 2005].

These industries also have a much higher reliance on foreign-born workers who, in turn, may find themselves or their places of employment subject to immigration enforcement actions. As the U.S. aggressively enforces immigration laws, farm workers, distribution and processing center workers, and food factory workers and their employers are subject to disruptions that could affect the flow of both agricultural products and manufactured food goods to consumers.

Finally, two general labor supply concerns confront the food manufacturing industry. The first is that younger workers are increasingly less willing to tolerate the pace and demands of factory jobs. This is a problem in several manufacturing subsectors, not just food and kindred manufacturing. Despite the comparatively higher pay received in manufacturing, including most food processing, many employers, especially in more rural areas, struggle to retain their workforces.

Part of this is a supply-demand mismatch caused by persistent rural outmigration to urban centers. Another factor is that a higher fraction of young people pursues post-secondary education degrees and certificates, so there is a much smaller pool of workers from which to draw. And part is due to the overall demographics of the country. The nation's population growth rate has slowed considerably since the early 1990s, mostly due to a declining birth rate. Exits of the Baby Boom generation from the labor force because of retirements are much greater than the entry of young replacement workers. Although the nation's population continues to expand, the ratio of the nation's workforce to its population is stagnant and considerably less than it was in the 2000s.

As in many industries, employers may try to boost compensation, may adopt new and labor-saving technologies, or may relocate facilities to or nearer larger population centers. Nonetheless, the nation's food producing industries have remained persistently resilient over the years in terms of employment. Their share of all manufacturing jobs has risen over the past 50 years, and overall employment trends have been mostly flat. Labor and working condition concerns, however, may affect that overall stability.

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