

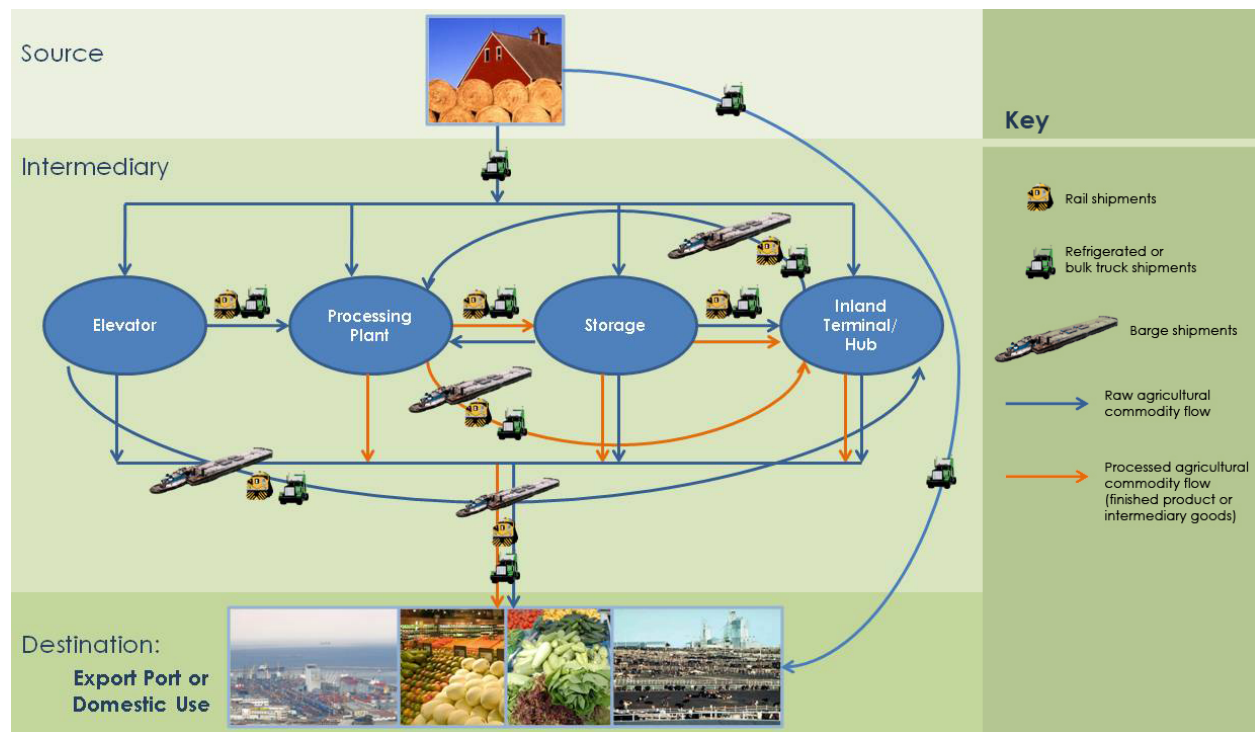
Introduction & Overview

Chapter 1

Chapter 1: Introduction and Overview

The charge from Congress can best be answered by an examination of the U.S. transportation system and the way it affects and supports agriculture and rural communities. The first step is to look at the function of transportation in agricultural movements and the role of agriculture in the national economy and international trade. With this background, the transportation issues facing U. S. agriculture—the needs of agriculture for transportation—can be evaluated. Those discussions are presented here as a general overview; details are presented in the chapters that follow. The overall flow of agricultural products is shown in Figure 1-1 below.

Figure 1-1: U.S. agricultural supply chain for raw and processed products



Agriculture Requires Transportation

Effective transportation was one of the necessary precursors to the development of agricultural productivity and, through it, the economic health of the United States. The heart of our country's development was agriculture; transportation was the facilitator of that development. Transportation investment increases markets for goods, raises the revenue farmers receive from their goods, lowers consumer prices, widens consumer choices, and lowers the cost of farm inputs.

The availability of transportation allows farms to locate where the soil and climate is suitable for their crop, and where land is less expensive. Agriculture is geographically dispersed;

because of its reliance on land, it cannot simply relocate near its customers, especially since more and more of those customers are global.

Agricultural production depends on a complete transportation system that includes all major modes of transportation (truck, rail, barge, and ocean vessel), with their complementary and competitive roles in transporting farm goods. The United States has been blessed with such a balanced system, as will be shown in this overview.

Modern transportation facilitated agricultural specialization, driving two major societal changes: it permitted workers to leave agricultural areas and migrate to urban areas for employment, making possible the growth of the manufacturing industry. Secondly, it greatly increased farm productivity by allowing crops to be raised in areas where the soil and climate were most favorable, even when those areas were remote from their markets.

Institutional, technological, and regulatory changes in transportation influence where commodities are grown and processed and livestock raised.

- The location of wheat milling reacted to changes in rail transit rates and hopper car availability.
- Refrigerated trucks, rail cars, and containers allowed California, Florida, and other States to become nationwide suppliers of perishable produce, meat, poultry, dairy, frozen food, and other processed products.
- Ethanol can be produced near its raw material (corn) and still reach its distant markets.
- Changes in the structure of the grain-marketing industry, with its reliance on fewer but larger facilities, have been facilitated by transport economies made possible by unit-trains and large barge tows.

Figure 1-2: Refrigerated trucks enable the trucking industry to provide special services.



Source: Hank's Truck Pictures

Due to its special needs or during periods of growth in volume, agriculture, in turn, puts pressure on the transportation system. Many agricultural commodities are perishable, seasonal, and of relatively low value, making efficient and appropriate transportation challenging but critical. When the transportation system effectively responds to these needs, the benefits to agriculture are enhanced.

- Entrepreneurs answered the need to transport perishable produce by developing mechanically refrigerated transport.
- The advent of just-in-time delivery and off-the-shelf inventory, which lower store costs—and consumer prices—by reducing storage and inventory costs, required flexible and reliable transportation. Transportation, especially trucking, rail, and ocean, answered by adapting modern logistics software to increase flexibility and response time.
- Because of the low value per unit of agricultural products, transportation accounts for a significant percentage of the cost to consumers. Enhancing transportation efficiencies by incorporating economies of scale and improving supply chain management practices can lower transportation costs, increase farm income, and reduce consumer prices.

Increases in transportation costs to agriculture can be directly translated into decreased prices paid to farmers because of their lack of market power—due to the competitive nature of agricultural markets—and eventually even higher consumer prices for food.

Although agricultural production is affected by weather, agricultural marketing is driven by price and competitive conditions outside the farmer's power. Farm production and consumer demand vary from one year to the next, causing an uncertainty that often places great stress on the transportation system. This stress prompts difficult decisions about how much transport capacity is reasonable and who pays for that investment, but also who pays for missed marketing opportunities and lost product sales. To date, the Government has played a long-standing role in highway maintenance and improvements, and in oversight of rail and ocean transportation.

Agriculture, Trade, and the Economy

The importance of transportation in making agriculture successful is noteworthy especially because of the role of agriculture in the U.S. economy. The U.S. gross domestic product (GDP) has been \$13 to 14 trillion in recent years. Of this, \$125 billion (1 percent) has been contributed directly by agriculture and \$540 billion (4.5 percent) by agriculture and its related industries.

Looking at the U.S. balance of payments, the importance of agricultural trade is even more substantial. USDA reports that total agricultural exports averaged \$82.2 billion from 2005 to 2008, reaching \$115.5 billion in 2008. Agriculture's net contribution to the balance of payments that year was \$36.1 billion. In May 2009, agricultural exports were forecast to exceed imports by \$15 billion. Analysis by USDA's Economic Research Service (ERS) of data from the Department of Commerce shows that every dollar of exports generates an additional

\$1.50 in economic activity in supporting sectors. The importance of these export markets, which rely on efficient transportation, varies for different commodities. For wheat, exports in 2009/10 were projected to account for 43.5 percent of production, followed by soybeans with 39.5 percent and corn with 16.5 percent. Poultry ships 17 percent of its production to international markets, and red meat 10 percent.

If any of these international—and often highly competitive—markets are lost due to inefficient transportation or failures in the supply chain, jobs are lost and farmers and ranchers receive less income. Inefficient or costly transportation can hurt agriculture in both international and domestic markets, and affect the balance of payments and the U.S. economy.

This study delves into the competition, capacity, rate performance, and modal service of rail, truck, barge, and ocean shipping. Policy issues affecting them depend on their operating attributes and their economic and regulatory environment.

U.S. agriculture uses four major modes of transport: truck, rail, barges, and ocean vessels.* Trucks are part of almost every movement, often moving crops from diverse farms to elevators or other collection points where they can be transferred to other modes. Trains provide the lowest-cost overland transport for long hauls. Barges are the least expensive transport where they can be used and carry large amounts of bulk grain to export terminals, where ocean vessels carry them to foreign markets.

Railroads

Agriculture and railroads have had a long and close relationship. The initial development of the United States was stimulated—even made possible—by the development of the major east-west rail lines. Land grants to the railroad companies made agriculture the source of development dollars for these early lines. As railroads sought settlers for those lands, both to increase the value of the land and to increase traffic on the lines, a win-win situation, an arrangement of mutual interdependence arose. This interdependence remains today; agricultural movements are critical sources of revenue for American railroads, and rail service is critical to agriculture. This symbiotic relationship underlies the current friction between railroads and shippers as each attends to its respective needs and goals.

Railroads carry the most ton-miles of total freight in the United States—more than trucks, and much more than barges. However, because truck rates are generally lower than rail rates for short hauls, railroads take in only about 13-15 percent of intercity freight revenue. Coal has the greatest proportion of total rail movements, but farm products, food, and kindred products make up over 15 percent of the movements and, for some railroad segments, as much as 80 percent.

* Air transport is important for some highly perishable agricultural commodities but is not a major mode for the sector as a whole. The legislative language establishing this study does not request an examination of air transportation for agriculture.

Rail Regulatory History

The unrestrained behavior of the railroads in the late 1800s and the dependence of many farmers on rail transportation led to enactment of the Granger laws. The Granger laws resulted in close regulation of the railroad industry.

As the size of the railroad plant and trackage grew dramatically in the late 1800s, the role of the government grew from promoting rail lines to regulating the industry. This change in role was addressed by the Federal government in the Interstate Commerce Act of 1887, which created the Interstate Commerce Commission (ICC). The role of the government also was expanded to eliminate price discrimination, open rates, and stop short-haul rates from being greater than long-haul rates.

The Transportation Act of 1920 was intended to bring financial stability to railroads; however, even though it granted the ICC the right to control entry, abandonment, and rates, it was unsuccessful. The Transportation Act of 1940, following the regulation of the motor carrier and waterborne transportation industries in the 1930s, sought to bring all modes under similar “fair and impartial regulation.” However, the financial condition of railroads continued to decline until policy makers began to point to the inefficient regulatory process as the culprit. Various acts followed, in attempts to avoid the bankruptcy or even nationalization of the railroad industry. The rationale of this regulatory scheme was initially to protect shippers but, as the financial health of the railroads was damaged, the industry’s needs for financial stability became a primary concern.

Concerns about the financial health of the railroads generated deregulation attempts (see Chapter 6). Finally, the Staggers Rail Act of 1980 was passed, granting railroads the right to operate as “profit-driven businesses,” which they have done since. Rate freedom, to a large degree, was granted. Abandonment of unprofitable branch lines was made easier. Private contracts with shippers were allowed. Rate and service relief for captive shippers were made available under certain conditions: the ratio of revenue to variable cost had to be over 180 percent, and the environment for shippers had to be noncompetitive.

Legislation in 1995 abolished the ICC and created the Surface Transportation Board (STB), with the responsibility for helping promote railroad revenue adequacy, granting railroads greater flexibility in setting rates, and protecting shippers from the exercise of excessive market power by the railroads. However, the issues of the 1800s are still with us today; shippers claim the emphasis of regulatory authority is on improving railroad revenue, with less interest in protecting shippers from the abuse of monopoly power.

Performance by the Railroad Industry

The Staggers Act has been a resounding success for both railroads and shippers. Since passage of the Staggers Act there has been an unexpected increase in the concentration of the railroad industry. The number of Class I railroads declined dramatically—down to seven operating in the United States—as a result of mergers and acquisitions. The amalgamation of the railroad industry has decreased competition among rail lines in many corridors, increased market power for the railroads, and generated increasing concerns about service and alternatives for shippers.

The ability of the railroads to abandon branch lines initially resulted in many unprofitable branch lines being abandoned, resulting in an overall loss of miles of track owned and operated by Class I railroads. This rail loss continued a trend from 1916, when line miles peaked at about a quarter of a million, only to drop to about 180,000 in the late 1990s. Wide-scale consideration of abandonment by Class I railroads soon gave way to the creation of short line or regional railroads, which now operate many of the lines considered for abandonment.

The American Association of Railroads reports that about 28 percent of track miles are now operated by short line railroads. This abandonment, or *rationalization*, of the railroad system is generally accepted as necessary because of the early overbuilding resulting from the government's desire to settle the country by promoting new rail infrastructure. Furthermore, government funding of public highways and inland waterway locks and dams increased transportation competition, making some rail lines redundant.

Short line and regional railroads have been generally successful in providing local and regional hauling services and traffic consolidation for the larger railroads. They enjoy a reputation of being more customer-oriented and carry less overhead and fixed costs. They sometimes partner with the larger lines, providing a seamless service to shippers. However the market power of Class I railroads can affect the market access, economic performance, and livelihood of the short line railroads. Shipping associations, development agencies, and short line railroads frequently complain about lack of service, rates, and market access available to them because of the policies of Class I railroads.

The railroad industry has large fixed costs; unlike barges and trucks, they provide their own roadbed, tracks, terminals, and facilities. The fixed costs are not affected by the volume of traffic on the line, so theirs is a decreasing-cost industry; these fixed costs are spread over all their volume. To recover all their costs, use all their capacity, and maximize profit, the railroads rely on differential pricing—charging different rates to different shippers, usually dictated by the competitive environment around those shippers rather than by the cost to serve them. By lowering their rates to customers with transportation alternatives, railroads can win more business, allowing it to recover the variable cost of the movement and some part of the fixed costs. This requires captive shippers—shippers with no viable alternatives—to carry more than their share of the fixed costs. Although shippers with more transportation alternatives pay a lower share of the railroad's fixed costs, their contribution reduces the share of those costs that captive shippers would pay without that traffic. By employing differential pricing, the railroad can maximize shareholder wealth, with some captive shippers paying more than customers with more transportation alternatives. The Surface Transportation Board (STB) has regulatory

and adjudicatory jurisdiction over railroad rate and service issues, including rate/cost ratios to ensure that rates are reasonable to captive shippers.

Rail rates declined in real terms after the Staggers Act, until 2005. Since then, however, Class I rates have risen significantly above short-run variable costs, with considerable variation for different commodities and in different regions (see Chapter 6: Rail Rates). The general decline in rates before 2005 was often accompanied by a shift of assembly and handling costs to shippers, who argue that true rate decreases, if any, were marginal. They argue that bottleneck rates, switching constraints, paper barriers, and antitrust exemptions are impediments to competition.

Figure 1-3: A unit train has more than 50 cars, all of which are shipped from the same origin to the same destination.



Source: World Shipping Council

Shippers are also affected by the density they bring to a rail line. *Density* is the volume per mile of line operated. To make the most efficient use of their capacity, railroads have begun running longer, heavier, and more frequent trains—shuttle and unit trains—over the major corridors. The savings have been beneficial to agricultural shippers, but they claim the railroads are shifting more and more of the costs of assembling the requisite volumes of product to the shipper, negating some of the benefits from the multiple-car rates. Shippers in remote areas and those needing specialized services, including short hauls, have found themselves with higher rates and deteriorating service because they cannot provide the density the railroads want. Many of the short line railroads operate in these remote service areas.

Railroads' attempts to create density on their lines (as manifested in a desire to "hook and haul") affect agricultural shippers. Smaller shippers are losing shipping alternatives or are faced with higher rates as railroads move from carload to unit train configurations. Shippers without access to unit-train facilities are forced to do the assembly themselves, incurring trucking costs and sometimes new terminal costs.

The impact of these structural changes on the railroad industry, combined with the importance of railroad service to the agricultural industry, results in continuing tension between carrier and shipper. Chapters 6 through 11 focus on the level of railroad competition, on which the STB was to rely in lieu of regulated rates, and the STB's ability to address abuse of market power. An examination of the level of competition is the underlying thrust of these chapters. Rural areas, because of their seasonal need for transportation and the perishable nature of their products, are particularly vulnerable to lack of competition, which along with capacity issues, are driving debates.

Barge Transportation

The four transportation modes—railroads, trucks, barges, and ocean vessels—all have been provided by some combination of private and public investments. For example, the railroads received the original land grants and promotional efforts of the Federal and many State governments. Highways and bridges are constructed and maintained for the trucking industry by local, State, and Federal government through fuel taxes and user fees. Harbor and river channels, and the locks and dams on the Nation's major rivers require substantial Federal revenues for their dredging and maintenance. Port development, capital expenditures, and maintenance are financed mainly through port revenues from operations, but bonds and public funding at the local, State, and Federal levels also are used to further port operations.

Grains are particularly dependent on barge transportation for access to international markets. Nationwide over the past 5 years, barges moved 30 percent of wheat, 52 percent of soybeans, and 59 percent of corn to all U.S. ports for export.¹ Governmental investment in waterway development has allowed areas far inland to compete in global markets, strengthening prices, lowering input costs, and providing access to more lucrative marketing opportunities.

Barges move large volumes long distances economically. Many bulk commodities are moved by water: coal, petroleum products, grains, food and farm products, forest products, sand, gravel, and stone. For example, typical tows on the Columbia-Snake River system in the PNW,

operating on a 12-foot channel, are three barges holding almost 10,000 bushels in one tow, equivalent to 100 railroad cars, or 400 trucks operating on the highways of the nation. On the Upper Mississippi River, with a 9 foot draft, typical tows move about 22,500 tons, equivalent to 225 railcars or 870 tractor-trailer units.

A History of Barging

The development of the United States can be tracked by the development of its internal transportation system. The early paths of pioneers became connecting roads between towns, villages, and coastal settlements. However, it was the navigable waterways that allowed the Nations' productive capacity to be realized. The early Erie Canal and the "Mighty" Mississippi River are parts of both our cultural and economic history. Waterways were developed before the railways. The first railroads often served as feeders to the waterways, just as motor carriers later developed as feeders to the railroads. In recent years, railways have again taken on the role of feeder to the waterways, both Class I railroads and, in the PNW, short line railroads.

The inland waterway system performs a dual role in the U.S. transportation system; it complements other forms of transportation but also is valuable as a competitor to keep the rates of other modes in check. Grain must be moved to barge facilities by truck or rail. This cooperation allows each mode to specialize in the movement it does best. Trucks are best suited to short haul assembly of products for longer haul by rail or barge, with trucks' low fixed costs and flexibility. Railroads and water transport are lower-cost movers of bulky shipments over long distances. "Water-compelled" rates on railway movements are a natural outcome of strong competition.

The Barge Industry

The barge industry's rate structure often is cited as a free and openly competitive market, even though the top five companies with covered barges (the kind that move grain) on the Mississippi controlled 75 percent of the barges in 2008. Barge rates reflect the significant variation in seasonal demand for barge capacity on the river, enough to counter the high level of industry concentration on the supply side of the market.

In the PNW, the concentration is even more pronounced; two firms out of five operate almost 80 percent of the grain barges on the Columbia-Snake River system. In that region, barges and grain shippers write long-term contracts with tariff rates as their base. The Mississippi River system places more reliance on the current spot market because of the large volume of grain and number of shippers on the system. Spot rates reflect the supply and demand for barge services and balance near-term demand needs (seasonal, international, and commodity-specific) with the available supply of barges.

Since 1998, the number of covered barges on the Mississippi River has dropped from 12,706 to 10,727, almost 18 percent. The barge fleet is aging; the average age of grain barges is increasing—28 percent are older than 25 years, within five years of their expected life span. Furthermore, more barges are being retired than new barges are being constructed.

Barge industry performance is very sensitive to the weather, time of year, and disruptions due to natural disasters. Anomalies in these affect operations at the locks and the overall capacity for barge freight movements. In the northern part of the country, the system is unusable for three to four months each year because of snow and ice. All of this means the industry's overall performance depends on factors often outside the barge operator's control.

Infrastructure

Barges are less dependent on the vagaries of the river than they used to be; the rivers in the inland waterway system have been tamed by dams and locks constructed to make the river navigable. About 12,000 miles of inland waterway are used commercially. However, many of the existing locks no longer meet the need of modern tows. Most of the locks on the Upper Mississippi River System have lock chambers 110 feet wide and 600 feet long, but a 15-barge tow cannot transit a 600 foot long lock in a single pass. The tows move through in two phases, taking twice as long as a single locking pass. This double locking substantially increases the cost of barge transportation and causes delays due to congestion at the locks in addition to the locking time itself.

Figure 1-4: A 1,200-foot barge tow—a common length—passes through a 600-foot lock in two stages.



Source: Army Corps of Engineers

Some agricultural stakeholders believe the locks need enlargement. Federal funding, utilized by the U.S. Army Corps of Engineers (Corps), is constantly being requested to retrofit and enlarge the locks. Competing transportation modes and environmental concerns have caused the funding of navigation improvements to become controversial.

In response to concerns from alternative modes, the Inland Waterway Revenue Act of 1978 set up the Inland Waterway Trust Fund, which is funded through a barge fuel tax. The tax is levied on about 11,000 miles of the most heavily used segments, referred to as the “fuel-taxed inland waterway system.”

Funds authorized from this trust fund are now combined with U.S. treasury funds in a 50-50 split to finance new construction and a major rehabilitation of the inland waterways infrastructure, but the trust fund is being rapidly depleted.

The Corps is continually looking at ways to reduce or eliminate commercial traffic delays while restoring, protecting, and enhancing the environment. Their Navigation and Ecosystem Sustainability Program (NESP) is a long-term program of navigation improvements and ecological restoration for the Upper Mississippi River System over a 50-year period.

Environmental impacts for the dams, locks, and estuary channelization (dredging that damages wildlife habitat) when reflected in the U.S. Army Corps of Engineers studies, affect the benefit/cost ratio of some projects, leading to delays in projects, increased costs, and reductions in navigational capacity.

A healthy water transportation system is important to agriculture and electric utilities that rely on coal as an energy source. The availability of efficient barge transportation impacts the U.S. competitive position and helps reduce emissions. Barge transportation costs less per ton-mile and is the most energy-efficient of any major mode of transportation, point-to-point. It is the strongest competitor to railroads in moving the Nation’s agricultural products.

Ocean Transportation

U.S. ports and the maritime industry provide access to existing and new, lucrative markets for agricultural products. Ocean shipping is an integral and critical mode for agricultural shippers and to the economy of the United States.

Agriculture is expected to contribute \$22.5 billion to the U.S. balance of trade, with exports of up to \$100 billion dollars.² The United States exports approximately one-quarter of the grain it produces. On average, this includes nearly 50 percent of its wheat, 37 percent of its soybeans, and 18 percent of its corn.³ Approximately 62 percent of the U.S. export grain shipments departed through the Gulf region in 2009, and 25.5 percent left through PNW ports.⁴ Eighty-six percent of foreign grain sales used ocean transportation to reach its market.⁵ Fifty percent of the agricultural exports by value and 20 percent by volume moved in containers.⁶ In calendar year 2009, the United States imported 23.5 million metric tons of fertilizer, mostly used by agriculture.⁷

The growth of international trade, which is expected by the U.S. Department of Transportation (DOT) to increase 50 percent in the next 20 years, poses a challenge to the maritime industry.⁸ Closures and inefficiencies in the maritime leg of the supply chain cause delays in movements, spoilage of perishable product, diversion to other ports or markets, increases in transportation costs, lower producer prices, and lost sales to American producers. U.S. exporters compete with other suppliers in the international market. Exports depend on globally competitive prices, so the lowest transportation costs often determine which supplier gets the business.

Structure of the Industry

The maritime industry relies on ports and vessels to reach global markets. Port facilities include bulk, container, palletized break-bulk, and liquid services. Bulk handling facilities move large volumes of products such as grain and fertilizer. Container facilities handle a wide range of agricultural products, including fruit, vegetables, meat, poultry, processed food products, grain, peas, and hay. Palletized break-bulk services handle fruit and frozen meat and poultry products.

Vessels are classified in many categories; those most relevant to agriculture are bulk and container vessels. Bulk vessels are chartered, unconstrained by specific route or schedule; container vessels operate over a fixed schedule and route. The development of the container vessel was instrumental in marketing high-value and valued-added U.S. commodities in international markets. These ships offer shorter transit times, less pilferage, reduced handling, offer better quality for perishable products, and increased security in identifying the source.

Container vessel sizes are increasing dramatically. Ships of 10,000 20-foot equivalent units (TEU) are now common, and 12,000 TEU—and maybe even 16,000 TEU—vessels are on the drawing tables of construction firms. These sizes allow tremendous efficiency with many products carried in the same shipment, generating economies of scale for the maritime firm but generating some issues of capacity, handling, and delay in the ports and the land side of the supply chain.

Figure 1-5: The Estelle Maersk has a capacity of 11,000 TEUs.



Source: Maersk Line

The container fleet consists of almost 4,700 container ships, with another 873 ordered and in various stages of manufacture. The recent recession dampened the delivery of some of these orders, and caused carriers to take many vessels out of service, significantly reducing the capacity available to shippers. Although carriers began returning vessels to service in 2010, capacity has not kept pace with recent rebounds in shipping demand.

Bulk shipping is a highly competitive market with many firms, all with little market power. Rates are known, fluid, and available to the highest bidder, usually on a voyage charter (contract) for a particular vessel. Vessels move freely from commodity market to commodity market in response to rate changes. This chartering system increases the flexibility of bulk vessels to respond to varying demands.

The vessels vary in size, with the choice of size depending on the demand of the market and the commodity being moved. Common sizes are *handysize* (20,000 to 40,000 deadweight tons (dwt)), *panamax* (60,000 to 80,000 dwt), and *capsize* vessels (110,000 to over 200,000 dwt). Panamax vessels are the size most commonly used for agricultural products. It is the largest size capable of traversing the Panama Canal, but this size is also active in transporting grain from the U.S. Gulf and PNW ports to Asian markets.

In February 2010, over 7,100 vessels were in the dry bulk fleet, with another 3,187 being on order.⁹ As ships are scrapped and new ones come on line, the capacity of the industry may stay high, which keeps maritime rates low. The industry usually reacts to lower demand by decreasing the number of ships in the trade lanes and idling or scrapping some of the vessels.

Federal Agency Responsibilities and Regulatory Environment

The oversight of the maritime industry in the supply chain involves several regulatory actors. Port operation is governed by local port authorities, and deep and shallow draft harbors are maintained by the U.S. Army Corps of Engineers. DOT, through the U.S. Maritime Administration (MARAD), works to promote the use of waterborne transportation, its seamless integration with other parts of the transportation system, and the viability of the U.S. merchant marine in order to meet national defense and economic objectives. MARAD also administers certain regulatory programs including enforcement of preference for U.S.-flag vessels in the carriage of certain government impelled cargoes and certain coastwise trade agreements. The Federal Maritime Commission (FMC) regulates the ocean common carriers, ocean transportation intermediaries, and marine terminal operators. The Shipping Act of 1984 partially deregulated the industry but continued to allow the anti-trust exemption, which allowed liner carriers to discuss rates jointly if they file agreements and discussion minutes with the FMC. The subsequent Ocean Shipping Act of 1998 (OSRA) allowed the market to operate more competitively under confidential service contracts.

Overall rates for bulk shipments have been high in recent years but have declined during the last year from the years of high demand and low supply of carriers. Container rates are typically negotiated in confidential service contracts, but the industry understanding is that increases in fuel costs resulted in some increase in overall rates before the recession caused those rates to fall to historic lows in 2009. Although carriers and exporters are currently negotiating their service contracts and rates for the next year, preliminary reports are that rates have begun to climb back toward pre-recession levels. Once rates have returned to a compensatory level for liner carriers, the continuing surplus of container vessel will likely impede significant additional rate increases.

Inland and Intermodal Issues

A continuing problem in the maritime system is the unavailability of containers for inland agricultural shippers. The availability of containers for exports depends on the import flow of containers, which are usually loaded with non-agricultural products and are not sent to rural areas where agricultural production takes place. Obtaining containers inland can be expensive and inconvenient. The willingness of ocean carriers and railroads to deadhead or position containers from the coastal areas to the inland points is related to their ability to load efficiently and pay for the deadheading. The agricultural shipper is then dependent on import flows, the railroads' willingness to position the containers, and the international rate for the full backhaul movement. Since containers have allowed agricultural producers to access new markets with differentiated products, dependence on these containers and concern about their availability has increased. During periods of strong demand for U.S. agricultural exports and insufficient numbers of available containers, sales of U.S. farm products have been lost.¹⁰

Port Issues

Ports face environmental concerns and the need to match capacity with demand. Imbalance causes congestion or expensive unused facilities. Private and local funding are combined with State and Federal expenditures to provide that capacity. Concerns about air quality, water pollution, invasive species, and wildlife affect the development of port sites and vessel operations. Environmental mitigation is underway at many ports and by many governmental agencies.

Truck Transportation

Every agricultural commodity and the inputs needed to grow or process it are moved by truck at some point. More and more cities and communities are served only by truck, further increasing its critical role. Trucks now move 70 percent of agricultural and food products, alcohols, fertilizers, lumber, wood products, paper, pulp, and paperboard articles. Trucks serve different roles, depending on the distance of the haul and the commodity. Locally, they move goods within cities from local distribution centers. They play a dominant role in some corridors for grain movements, especially when backhaul opportunities exist, and have long dominated movements of meat and milk products, fresh fruit, and vegetables because of the high value of the products and trucks' speed, reliability, predictability, and ability to move goods directly from production points to end destinations without transshipment. Presently, they combine with rail in container-on-flat-car (COFC) and trailer-on-flat-car (TOFC) movements.

The Highways

The motor carrier industry depends on the highway system. The United States has almost 4 million miles of public roads, of which over 46,000 miles comprise the interstate highway system, which carries most U.S. ton-miles. Roads, unlike railroads, are provided by government sources and paid for (over 80 percent) by fuel taxes, other fees and tolls. Interstate highways and rural arterials (generally State highways) handle up to 15 percent of total vehicle miles. Local roads (collectors and distributors) carry almost 80 percent of road miles but slightly less than 40 percent of traffic, due to the lower density of usage in rural areas.



Figure 1-6: Highways are vital to the trucking industry.

Source: USDA

The Highway Trust Fund is at the lowest level in history. It depends on the Federal fuel tax at a time when less gasoline is being sold because the economic downturn is reducing driving miles and the fuel efficiency of vehicles is increasing. This decrease is combined with a policy decision to move some funding from maintenance of the roadways to address other issues such as mass transit, safety, security, economic development, and air pollution and other environmental concerns, even as the cost of maintenance has increased dramatically. The solvency of the Highway Trust Fund has led to the current debate on the sources, structure, and magnitude of future funding, a debate that has substantial implications for agriculture.

Carrier Operating Costs

The trucking industry has low fixed costs and high variable costs, largely because fuel and labor are such important components of the operating costs. Terminal costs, the major fixed-cost component for truckers, are very low for grain and a small portion of the total costs even for perishables. Entry to the trucking industry is easy, consisting in many cases of only a down payment on the truck, and further aided by the fact that an active market exists for used vehicles. Ease of entry and exit, along with the low fixed costs, allows the trucking industry, which is exempt from economic rate and route regulation, to shift capacity to areas and commodities of high demand, a characteristic especially useful to agriculture, with its shifting and seasonal changes in demand for transportation.

However, trucks consume a lot of energy and are a major producer of emissions, concerns that transcend their economic efficiency. This basic issue of market efficiency versus environmental effects is important to future development of the transportation system.

Structure of the Industry

The trucking industry is comprised of private fleets owned by companies that manufacture and/or distribute their own goods and for-hire vehicles that haul goods for others. There are 691,000 trucking businesses, and nearly 4.5 million trucks (including straight trucks and tractors). According to an American Trucking Associations' report, in November 2009 there were 227,930 for-hire carriers, 282,485 private carriers, and 81,466 other interstate carriers that did not specify their status.¹¹ Over 96 percent of trucking companies are small businesses with fewer than 20 trucks, and 87 percent have 6 or fewer trucks.¹² Nearly 50 percent of trucking companies have only one truck (owner-operators).

These trucking firms, which are exempt from economic regulation of rates, routes, and service, are small and competitive. Although it varies widely, the average ratio of operating cost to operating revenue is a tight 95 percent in over-the-road long-haul truckloads, demonstrating that this sector is highly competitive, approaching what economists call atomistic or perfect competition. Many studies have shown that their rates are closely aligned with their operating costs. Variable costs are substantial, so rates are built with variable costs as the floor but with little variation above this level. Rates rise in response to seasonal demand, causing trucking capacity to flow to the area where demand is strongest.

Trucks have been thought to be competitive with rail for movements of 300 miles or less, but the recent usage of short line railroads has been shrinking that distance. In the long run, it is not the cost but the quality of service that gives trucks their competitive advantage in long-haul moves. Trucks have been heavily used in short-haul domestic markets but, with the emerging demands for service and flexibility in port areas, are making more long-distance movements to ports and terminals. The net result of the differing length of haul is that trucks move more tons than rail or barge but fewer ton-miles, due to their shorter hauls. Just-in-time and off-the-shelf inventory management practices have increased the competitive advantage of trucks, as has the use of COFC and TOFC configurations, because of their reliability.

Recently, the trucking industry has been characterized by mergers, bankruptcies, and restructuring. Over 3,000 trucking firms have been lost in recent years, with some of that capacity leaving the industry and not being replaced.

Regulatory Status

For years, all trucking firms required a Certificate of Convenience and Necessity, with tight rate and route controls, to operate in the United States, a form of regulatory control by geographical market. This regulation was eliminated in 1980, essentially deregulating motor carriers in the United States. Policy makers, realizing the constraints on the market imposed by such entry restrictions, combined with the needs for flexibility (due to perishability and seasonality) of the agricultural industry, had included an agricultural exemption of livestock, fish, and unprocessed agricultural commodities in 1935 during the original major legislation. The success of agricultural shippers served as a role model for the motor carrier industry when deregulation occurred in 1980. The act in 1995 that terminated the Interstate Commerce Commission also prevented States from controlling rates, routes, service, or tariff filings. Hours-of-service and other safety and security rules still remain. Antitrust immunity was removed in 2008.

Infrastructure and Funding

The issues affecting trucking today include the deteriorating condition and increasing congestion of the highways and the need for investment in infrastructure, including bridges. The funding sources usually include some sort of user fee, either as fuel tax, vehicle use tax, sales taxes on trucks and tires, tolls, or registration fees, all of which increase operating costs. Poor road conditions and congestion also cause motor carriers to operate at less than optimum efficiency, affecting their energy use and their impact on air quality.

Although much of the congestion and need for greater road capacity occurs in urban areas, it also affects rural areas. Trucks that service rural areas have to travel to and through cities to pick up and deliver goods and to carry exports to ports. Urban traffic problems increase the cost to farmers and can cause them to lose markets.

Conclusions

Transportation has been critical to the development of American agriculture and the economic growth of the United States. The heart of our country's development was agriculture; transportation was the facilitator, and sometimes the cause, of that development.

The railroad industry was heavily regulated for years, stifling growth and investment. The Staggers Act lifted this regulatory burden, allowing economic recovery but not removing the antitrust exemptions granted in 1914. Concentration in the industry has reduced competition and given the railroads greater market power, to the detriment of some captive shippers, especially in the Upper Midwest.

Inland waterborne transportation is the most economical and energy-efficient mode of point-to-point transportation. Competition among barge companies is strong, keeping rates low. However, the barge industry is dependent on an aging system of locks and dams. Older locks are too small to handle modern barge tows efficiently, so they must be disassembled and taken through in sections. Because of their age, locks require frequent maintenance and repair, which is not only expensive but disrupts the flow of traffic and causes choke points and inefficiency.

Two types of ocean vessels carry most agricultural products: bulk vessels that carry grain, oilseeds, and edible oils, and container vessels that carry high-valued products, including meat, fruit, vegetables, and specialty grains. Both are dependent on ports. United States ports are under pressure from two fronts: they need to retain and grow market share, and they need to control and reduce their pollution. Trucks provide a vital flexibility to agricultural transportation. They are the most effective method of moving goods short distances and for assembling quantities of products at elevators and warehouses for transloading to other modes of transportation. Much agricultural trucking is local; trucks are often owned by farms and driven by farm workers. Trucks are dependent on the Nation's roads and highways, and funding to repair and keep up our roads must be found.

Agricultural transportation in the United States is a vital and efficient network of trucks, trains, barges, and ships. To keep America's agriculture strong and competitive in the global market, this network must be maintained and strengthened.