A Comparative Study of the Trucking Industries of the United States of America and Poland

Part A. An Overview of the Trucking Industry in Poland: 1975-84

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Abstract

This paper along with a companion working resulted from collaborative work of an economist from Poland and an economist from the United States of America (USA) that compares the trucking industries of Poland and the United States of America (USA). Although occasional references are made to the trucking industry in the USA in this paper, a second working paper generated by this study (Part B entitled, "An Overview of the Trucking Industry in the USA," contains a more thorough examination of the trucking industry in the USA. This working paper focuses on the Polish trucking industry.

The state-owned and cooperative firms dominate the for-hire trucking industry. Since 1975 the state-owned not-for-hire trucking firms have increased their share of trucking fleet capacity significantly and their share of trucking tonnage and ton-kilometers despite being less efficient than the for-hire carriers. Because the Minister of Transport regulates only the state-owned public motor carriers, he is limited in trying to allocate traffic through regulation. There are some basic differences and striking similarities, between the trucking industries of Poland and the USA. The basic differences, however, reflect some of the fundamental differences between the two countries outside the area of transportation.
An Overview of the Trucking Industry in Poland: 1975-84

I. Introduction

Since the beginning of the decade, Poland has been in the international spotlight because of both political and economic unrest. Poland is still recovering from the economic crisis and continues to have many shortages. Less known are the economic reforms that were introduced in Poland at the end of 1981. The basic thrust of these reforms was the replacement of many of the command elements of the Polish economic management system with elements of the market system. The role of the market in economic decision making increased substantially. All firms, including trucking firms, were made self-dependent and the principal measure of efficiency of firms became profit. The behavior of firms changed significantly and both decision makers and economists in Poland were faced with a new environment.

Given these recent reforms in both countries, that is, the Polish reforms and the U.S.' deregulation, the time appears to be appropriate to compare the transportation industries in the United States and Poland. The transportation policy makers in Poland might find the experiences of the trucking and railroad industries in the United States valuable as the Polish government attempts to introduce the elements of the market into its economy. The experiences of the U.S. transportation industries under both a highly regulated and more currently a much less regulated environment provide a wealth of knowledge about transportation policies that work (and don't work) in an economy with market elements. Likewise, the transportation policy makers in the United States can learn from the transportation experiences in Poland.
This paper's primary purpose is to review the Polish trucking industry with the focus on its present status and structure and the major issues and problems facing both trucking industry members and policymakers. When appropriate, comparisons between the two countries with respect to trucking are made. The authors are well aware of the magnitude of the socioeconomic differences between Poland and the United States. However, as will be seen below, there are some developments and trends in trucking that are common to both countries.

II. Overview of the Polish Economy and the Provision of Transportation

When discussing and analyzing modal shares in the transportation system of a country, it is important to consider the following factors:

1. the geographical, social and economic features of the country;
2. the location of resources, sea ports, industries, and population;
3. historical circumstances;
4. the state of development of each of the modes;
5. the transportation policies of the country; and
6. the international position of the country.

The last factor, the international position of Poland, which creates some basic differences between the trucking industries in Poland and the United States, provides a good starting point for examining the nature of the Polish trucking industry. The area of Europe is 10.5 million square kilometers which is only slightly larger than the area of the United States (9.4 million square kilometers). Europe is divided into 34 countries which differ substantially in terms of

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1See: (6), (7).
size. On one hand, the Soviet Union, the largest country, covers 5.6 million square kilometers or about 53 percent of the area of Europe while, on the other hand, there are very small countries like the Vatican, Monaco, Liechtenstein, San Marino, Andora, and Malta, countries which collectively have only 1,062 square kilometers. More than 65 percent of European territory is comprised of socialist countries.

Poland is situated in the middle of Europe, and thus, occupies a position where it is convenient for the transportation of goods and passengers between East and West Europe and between South and North Europe. Problems of integrating international transportation occurs within particular socioeconomic systems, e.g., socialist countries, and within entire Europe. Addressing these problems of international integration of transportation systems are two internationally based projects that are being undertaken during the second half of 1980s—the Trans-European Motorway (TEM) and the Trans-European Railway (TER). These projects, carried out under UNDP auspices and Inland Transportation Committee of the European Economic Committee of United Nations, deal with North-South transportation connections. They are investigating the possibilities of highways and railroads from Scandinavian countries via ferryboats to Polish ports Gdansk and Sczecin, through Poland, Czechoslovakia, Hungary, Bulgaria (with a branch to Yugoslavia) to Turkey and other countries of the Mediterranean Sea Basin.

This project affects the transportation system of every participating country and stimulates development of an integrated transportation system on an international scale. In the case of Poland, the
project could be an incentive for an acceleration of the construction of highways. Because of its vast size, the United States does not face such problems of international surface transportation.

Poland is a middle-size country covering an area of 312.7 thousand square kilometers. The size of Poland is nearly identical to the size of the state of New Mexico. There are 59 countries in the world larger in area than Poland, and 24 countries with larger populations. In Europe, countries with more territory than Poland are: Soviet Union, France, Spain, Sweden, Norway, and Finland. Poland is a flat country, with mountains on the south and the Baltic Sea on the north. Its terrain allows good transportation accessibility for most of the country.

The basic natural resources are located in the south part of Poland, especially in Silesia. The south part of Poland is the most industrialized part of the country and has the highest density of transportation network. The most important freight origins are in Silesia while the sea ports, which are located about 550-650 kilometers to the North, are the most important destination points. Raw materials obtained in Silesia, especially coal, still play a very important role in the Polish economy and in the Poland's foreign trade. Industry's share in Gross National Product (GNP) in Poland in 1984 was 58 percent; agriculture, 16 percent; construction, 9 percent; and all other activities, 17 percent.

Poland's basic industrial structure in 1984 was as follows: machinery and metal industry—25 percent, food industry—24 percent,
energy materials--14 percent, textile--9 percent, chemicals--8 percent, wood and paper--4 percent, and metallurgy--8 percent. This industrial structure creates substantial transportation needs, especially for large volume shipments moving long distances relative to the size of the country.

The population of Poland in 1984 was 37 million people of which 60 percent lived in towns, about 11.4 million people were 18 years old and younger and 3.5 million were 65 years old and older. About 7.1 million people were dependent on work in the agricultural sector, which was about 19 percent of the population. The density of population of Poland was 118 persons per square kilometer, while the average in Europe was 66 persons, and in the United States, 25 persons. Thus, Poland is a relatively densely populated country and one whose population is comparatively young.

Since 1946 Poland's population increased by 69 percent growing from 23 million people to 37 million people. During the second world war Poland was devastated with its towns receiving the most damage. For example, in Warsaw about 80 percent of the houses and buildings were damaged. These damages along with the rapid increase in population made construction of houses a very large task after the second world war. In addition, Poland had its infrastructure and industry damaged. In 1946 the trucking consisted of only a few thousand trucks and an infrastructure of damaged roads. Additionally, many mistakes were made in the Polish economy since the early 1950s, which have had cumulative adverse effects.
Poland has about 100 thousand kilometers of roads with asphalt pavement which translates into 32 kilometers per 100 square kilometers. Streets are not included in this total. When both paved and unpaved miles are included, the road density increases to about 82 kilometers per 100 square kilometers which is about average for European countries. For example, West Germany has about 105 kilometers per 100 square kilometers and Yugoslavia has slightly less than 50 kilometers per 100 square kilometers. In comparison, the United States has about 55 kilometers per 100 square kilometers. These indicators of road density change when put in terms of population. Poland has 73 kilometers per 10,000 people; West Germany, 45; Yugoslavia, 52; and the United States, 233. Poland is poorly equipped in terms of highways. In comparison with the United States and some West European countries, Poland could be viewed as being disadvantaged in terms of highway development.

Another very important problem for trucking in Poland is the need to import all of the country's supply of gasoline and diesel fuel. Polish importing possibilities are very limited in the 1980s and will continue to be in the 1990s.

Railroads, the main competitors of trucking in Poland, are in a relatively better situation. Railroads use and are based on national resources. For example, the rail network is already very well developed with a density of 8.5 kilometers per 100 square kilometers, which is higher than the 3.4 kilometers of rail mileage per 100 square kilometers found in the United States. In addition, all of the rail equipment is produced in Poland. In fact, Poland exports rail cars. Finally, the
rail system in Poland uses electrification as its source of power, which is produced using abundant Polish coal, and thus avoids the use of imported diesel fuel.

Because of dominance of heavy industries (coal mining, metallurgy, raw materials, industrial building, etc.) the Polish transportation policies through 1980 favored the railroads over trucking. After 1980 railroads continued to be given preferences in the transportation policies because of the above arguments and because of their superior labor productivity. The railroads' labor productivity was three times higher than that of the trucking industry in terms of ton-kilometers. Further development of the trucking industry, however, is inevitable. In 1980 the amount of freight transported by truck was 50 percent higher than it was in 1970, while railroads had increased their freight amount by only 26 percent.

Insert Table 1 about here

An economic breakdown in the late 1970s and a crisis after the 1980-81 time period caused a substantial decrease in overall freight movements which especially affected the amount of freight traditionally moved by the trucking industry. Interestingly, sea navigation carried 30.2 million tons in 1975 and 35.4 million tons in 1984, representing an increase of 16 percent during the same time period.

Average length of haul increased in the trucking transportation from 19 kilometers in 1975 to 26 kilometers in 1984, while railroads increased their average length of haul by 10 kilometers, up to 290 kilometers. These increases in the trucking industry's average length
of haul made possible the increase in total revenue ton-kilometers by 12 percent.

During the years of the crisis, 1980-1981, trucking took over some of the loads from the railroads, which changed the relative position of these two modes in the transportation market. The trucking industry's advantages over railroads, including its capability to provide door-to-door service which allows it to serve all firms, is a factor in its gain in traffic shares. The trucking industry's ability to provide door-to-door service to any shipper or receiver is particularly important in meeting the needs of agriculture, construction and the retail and wholesale industries. Trucking has more than 90 percent of the market in these industries. These industries, which have scattered points of origin and destination, generate about 70 percent of the total tons carried by trucks in Poland.

III. The Trucking Industry Structure in Poland

Because of different socioeconomic systems in the United States and Poland, their trucking industries' structures also differ. In Poland, the socialized sector prevails (except in agriculture, where only about 18-20 percent of the activity is under the socialized sector, and in the craft industry). There are two general forms of socialized trucking industry ownership in Poland: (1) state-owned firms, and (2) cooperative firms.

State-owned trucking firms are divided into two general categories: (1) public carriers, and (2) carriers for particular trades. The public carriers can be grouped into two basic sectors. One is the National Automobile Transportation sector, which is comprised of four
firms that provide both passenger and freight service for all areas in Poland. The other sector is called the Enterprise of International Automobile Freights or PEKAES "Autotransport" (PEKAES). PEKAES is a joint-stock company with more than 51 percent of the shares belonging to the state. This enterprise acts as an intercontinental carrier in Europe, Asia, and Africa, serving Polish and foreign shippers.

The other sector of state-owned trucking firms is comprised of carriers of trades. These firms provide service to particular branches of the national economy. They are grouped as follows with the number of trucking firms for each branch indicated in parentheses: mining and energy trades (11), metallurgy and machinery (6), construction (27), forest and wood products (1), retailing and wholesaling (18), and the chemical industry (2). All of these 71 firms are for hire carriers, self-managed and self-dependent and operate without subsidiaries as a principle. Each group of these firms has its own rules and regulations as provided by appropriate ministers. The Minister of Transportation only regulates public carriers, which collectively carry less than 15 percent of total trucking freight. This substantially incomplete regulatory control over the trucking industry by the Minister of Transportation is a very important transportation policy issue in Poland.

Within the state ownership sector, there is a third kind of trucking--trucking performed by nontransportation state-owned firms using their own trucks. These nontransportation state-owned firms have trucks scattered throughout the economy. Because there are no
reliable statistics on the number of trucks involved in this type of operation, only estimates on the number of trucks in this sector exist.

Cooperative owned trucking firms number 151 and are of two kinds. One kind is the cooperative public carrier, which is comprised of 41 firms. The other 110 cooperative carriers serve the three largest cooperative organizations and are called cooperative carriers of the trades. The Union of Peasant Cooperatives serves its customers by 49 of these firms. The Union of Dairy Cooperatives, which represents the entire dairy industry in Poland, is served by 38 of these cooperatives of the trades carriers. The 23 trucking firms serving the Union of Horticultural and Apiculture Cooperatives provides service to fruit farmers, vegetable farmers, honey producers and the people and firms buying and processing their products.

These 151 cooperative trucking firms are considered for-hire carriers. They have their own statutes carried out by shareholders (persons and organizations) and accepted by respective cooperative unions. The cooperative trucking firms operate under the rules and regulations established by the International Cooperative Union and the national cooperative unions.

In 1984 in Poland there were about 108,500 privately-owned, for-hire carriers, but most of these carriers provided passenger transportation services, not freight services. Privately-owned firms in trucking do not play an important role because they are mainly small firms with only one or a few trucks and most of these trucks have only one-to-three tons capacity each. In 1980 there were 154,000 privately-owned trucks in Poland but this number increased substantially by 1984
to about 200,000. They were owned mostly by farmers, craftsmen, and shopkeepers. Private trucks comprised about 25-30 percent of the total truck fleet in Poland, but their share of total capacity was less than 10 percent.

The control of the total truck fleet in Poland in 1984 (in terms of percentage of total number of trucks) by type of operation was: (1) for-hire carriers—14 percent, (2) not-for-hire carriers by other socialized industries—55 percent, (3) privately-owned carriers—about 25 percent, and (4) others—about 6 percent. These figures reflect a situation that is becoming an important issue for the Polish trucking industry: the number of trucks owned by for-hire carriers vis-a-vis the number of trucks owned by non-transportation firms. In 1984, the nontransportation firms owned three to four times as many trucks. The Minister of Transport and economists in Poland generally agree that this situation has to be changed.

Information concerning firm size is presented in Table 2.

State-owned motor carrier firms are bigger than cooperative-owned firms. Among the 16 largest firms (firms having 1000 vehicles or more) four of them are public carriers and the remaining largest firms are carriers providing service for particular trades: seven carriers for retailing and wholesaling, two carriers for the construction industry, two carriers for the mining and metallurgy industry, and one carrier for the forests and wood products industry. There is no cooperative firm among the 16 largest trucking firms.
The structure of the Polish trucking industry has changed during the 1975-1984 time period. Two general changes occurred in the for-hire category: (1) an increase in the number of firms from 178 in 1975 to 194 in 1980, and to 222 in 1984; (2) a decrease in the average firm size. The total number of firms owned by the state was reduced by 15 while the number of cooperative owned firms increased by 59 between 1975 and 1984. Figure 1 illustrates the changes in firm size structure during the 1975-1984 time period.

The market division in terms of tons carried and ton-kilometers among the different components of the trucking industry in Poland is shown in Table 3. The data in Table 3 also show how substantial the economic breakdown in Poland was after 1980. The amount of freight carried in 1984 was only 65.5 percent of the 1980 amount and 81 percent of the 1975 level. Because of an increase in the average length of haul, however, the decrease in revenue ton-kilometers was only 18 percent (in 1980—44546 ton-kilometers, in 1984—36577 ton-kilometers).

From the point of view of transportation policy of the state, the most negative development is the substantial decrease in the freight hauled by the for-hire carriers. The 1984 level of freight hauled by the for-hire carriers was only 55 percent of the for-hire carrier level in 1980 (see Table 4 and Figure 2) and only 44 percent of total freight hauled in 1984.
Table 4 shows several important trends in the Polish trucking industry. First, the for-hire carriers' share of the overall truck fleet decreased by 32 percent between 1975 and 1984 with the not-for-hire carriers increasing their share by 16 percent during the same time period. Secondly, although the for-hire carriers also had decreases in their share of revenue ton-kilometers and tons, their decrease in these two areas were much smaller than the decrease in their share of the fleet in terms of number of trucks.

The changes in the revenue ton-kilometers among the various components of the Polish trucking industry are explained by the information in Table 5. The data in Table 5 clearly show the substantial increase in the average length of haul in the for-hire component of the Polish trucking industry over the last 10 years. Particularly noteworthy is the large increase in the average length of haul by public carriers—which increased by 60 percent during the 1980-1984 time period. These developments resulted from several factors. First, the public carriers participated more heavily in long distance hauls. In addition, the average capacity of trucks owned by public carriers was 13 percent larger than the average capacity of trucks operated by other types of carriers. These two factors explain why there was less of a decrease in revenue ton-kilometers by the for-hire carriers.
sector than what the dropoff in its percentage of fleet capacity (in terms of number of trucks) might have suggested. Finally, there was an insufficient quality of transportation services produced by for-hire carriers, and, in particular, by public carriers.

These factors create different levels of productivity on a per truck basis in the particular segments of the trucking industry in Poland. The difference between the level of productivity per truck and the type of carrier (for-hire carrier versus not-for-hire carrier) is substantial, as revealed in the last column of Table 6. The average truck owned by a for-hire carrier produced 2.33 times more revenue ton-kilometers, carried 48 percent more tons, was in operation 50 percent longer, and traveled 54 percent more vehicle-kilometers per year than its counterpart truck owned by the not-for-hire carrier.

The coefficient of loaded haul, which is the proportion of a truck's total trips that have loads, was stable during the 1970s. In 1980 the coefficient of loaded haul was 0.72 for for-hire trucking and 0.67 for other types of trucking indicating that each for-hire backhaul was better used than the not-for-hire backhaul. This high load factor was achieved by an obligation of carriers to pick up back loads, or backhauls, arranged by forwarding agencies. This obligation to pick up backhauls is held by all state-owned carriers with only a few exceptions granted.
There are no statistical data maintained concerning the size of consignment, that is, whether the shipment is a truckload or less-than-truckload shipment. This type of data is viewed as important and should be introduced into the Polish transportation statistical data system.

Relatively short distances of hauls make it possible to make many loaded trips per day in Poland. In 1980 trucks operated by for-hire carriers made on average six and a half trips daily, while trucks operated by not-for-hire carriers made an average five daily trips. These average daily trips differ significantly from the operations of the international carrier, the "PEKAES," which averages about eight driving days for each load.

Energy efficiency in the Polish trucking industry is considerably better in the for-hire sector. Data on energy efficiency in 1984 revealed that for-hire trucking had an energy efficiency rating of 2.07 kilograms/ton and 0.064 kilograms/ton-mile while the not-for-hire trucking sector had 3.22 kilograms/ton and 0.156 kilograms/ton-mile (3). The for-hire sector had a 39 percent lower energy consumption on a per ton basis and a 60 percent lower energy consumption on a per ton-mile basis. These differences in energy efficiencies have generated important policy discussions concerning the Polish trucking industry.

These factors, the average productivity per truck and the energy efficiency, generate differences in costs among the various sectors of the Polish trucking industry. Investigations carried out in 1985 and 1986 revealed significant differences in costs per ton-kilometer among
the various sectors of trucking (3). For example, the average costs for public trucking were 4.81 zlotes per ton-kilometer while the average costs for the trades carriers were 7.94 zlotes per ton-kilometers or 165 percent of the average costs of the public carriers. In comparison, the average cost figures for the not-for-hire carriers were 12.18 zlotes per ton-kilometer or about 254 percent of the average costs for the public carriers.

The data clearly show substantial differences in unit costs between different types of carriers in Poland. The Polish transportation policy makers are currently faced with the problem of how to encourage carriers, shippers, and researchers to develop a model of the most appropriate trucking industry structure given these large differences in the average costs of trucking.

V. Basic Types of Services Offered

Reliable statistical data are lacking in Poland that would help describe in detail the systems of carriage or types of services offered by the trucking industry. However, the following basic trucking operations can be delineated:

a) Regular haulage of less-than-truckload (LTL). Scheduled trucks have interregional and national coverage. This type of trucking service is most similar to the LTL common carrier trucking service provided in the United States.

b) Service of railroad terminals provided by one carrier for all consignments on behalf of railroads.

c) Centralized trucking service to shippers of a given region provided by carriers on a for-hire basis.
d) Trades' trucking needs met by trades and public carriers, based on long-term agreements with particular shippers.

e) Hiring trucks for client's immediate use. This type of service includes renting a vehicle with driver and thus resembles the full service truck leasing operations that were only recently legalized in United States.

f) Self-service trucking, operated by nontransportation firms to meet their own trucking needs. This type of service would be called private trucking in the United States.

The allocation of traffic among these basic types of services in a recent time period is shown in Table 7.

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Insert Table 7 about here
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In addition, a coordinated system of trucking services and haulage based on linear programming methods has been developed. This system, which involves the coordination and cooperation of trucking firms and forwarding agents, has been applied mainly in the long distance trucking situations. The role of containerization, which has been a growth area in the United States in the last several years, is relatively small in Poland. In 1980 trucks carried only 9.1 million tons in containers and 6.5 million tons using pallets.

It should be noted that the time period covered in this review of the trucking industry, 1975-1984, covers two different and distinct phases of the Polish economy. There was an increase in economic activity between 1975 and 1980 while there was a breakdown and crisis in the economy between 1981 and 1984. As the result of these changes
in the level of economic activity, the transportation markets' situation changed dramatically from one of shortages of transportation capacity up to 1980 to overcapacity after 1981. Economic reforms were introduced which changed the economic mechanisms used to implement policy (5). In general, enterprises were made self-dependent, self-managed and based on the principle of profit. Economic methods and incentives replaced the more command elements of the government. This change created a radically different environment for the activities of firms. This paper does not attempt to evaluate the results of the implementation of these reforms although some of the implications of these reforms on the optimal scope and nature of trucking regulations and the most appropriate strategies by trucking firms are alluded to in the next section.

VI. Government Regulation of Trucking

At present the Polish trucking industry is regulated by many ministries with each type of owner-organization having its own regulations. Each type of trades carrier is regulated by the ministry which owns it. For example, the Home Trades Ministry regulates the 18 home trades carriers, the Central Unions of Cooperatives regulate their carriers, and so on. Cooperative public carriers have their own regulation provided by their own cooperation.

The operation of trucks owned by nontransportation firms, that is, firms providing their own trucking service, is regulated by the individual firms. In essence, it means that regulation is provided by some 10,000 firms.
The Ministry of Transport regulates the state-owned public carriers and thus can influence their activity. The remainder of the trucking industry operates outside the regulatory control of the Ministry of Transport. The not-for-hire carriers, as well as all other trucking firms, are regulated by local authorities who establish local rules for carriers operating within the local jurisdiction.

Trucking industry regulations by the government, particular government agencies, and by local authorities consist of the following types: traffic rules, trucking fares (rates), decision making with respect to infrastructure, distribution decisions for liquid fuel (diesel and gasoline) and trucks, establishment of new trucking firms, prices of fuel, and road tax, social privileges, clearing accounts with budget (both local and central), issuing licenses for privately-owned carriers, and executive rules implementing the law established by parliament.

The Polish transportation industry is overregulated in some aspects while at the same time it is not controlled sufficiently in other aspects. The trucking industry is overregulated especially in the fuel and trucks distribution area and sometimes in the area of executive rules implementing the general law. There is insufficient regulation, however, in that the Minister of Transportation, who is responsible for the nation's transportation policy, cannot affect the entire trucking industry because his office does not regulate all of the organizational and functional categories of trucking. The traditional policy of giving the Minister of Transport regulatory control over only a portion of the trucking industry has been reinforced by
the recently established goal of making transport self-dependent with revenues collected from the users.

VII. Purchasing Trucking Services in the Current Economic Environment in Poland

Economic activity in Poland is run in terms of shortages. Producers place items on the market and the competition is among the buyers. Each firm is a producer and a buyer. To obtain a supply of a good is a more difficult problem than to sell one's own output. In this environment, prices (including transportation rates and fares) are established in two general ways: (1) determined by agreements between producer and buyer, which is the typical case, and (2) regulated by government.

When there isn't competition among the sellers, and prices are based on the costs of production plus a certain level of profit. In an economy where demand exceeds supply in most sectors, the situation is that the higher the costs, the higher the prices. Purchasers must still wait for the products. Higher transportation costs make the total costs of the particular product with excess demand higher, but the users are not sensitive to these higher prices and will still purchase the item. The most important issue for every manufacturer is to ensure itself delivery of raw materials and other inputs necessary for production. Deliveries of inputs are not always regular, and in certain cases, fail to arrive. These factors create the need for firms to maintain higher levels of inventory of raw materials and other inputs.
The users of trucking services require transportation that is readily available. The costs of transportation is given much less consideration. Firms can either use for-hire trucking firms or own their own trucks. For-hire carriers are not always immediately available for use by the shipper. The uncertainty of supply of materials discussed above increases the amount and variability of time the firm spends on waiting and unloading, and even for the return of trucks. The extra time that this uncertainty generates direct costs for the shipper because of the extra charges the for-hire carriers have in their tariffs for delays. These extra charges, or fines, or what in the United States would be called detention charges, diminish the profits of the shippers and are used to discourage excessive times of loading, unloading, and waiting. The carrier prefers to earn revenues for providing transportation instead of through these charges. The solution for shippers is to own their own trucks which makes it more convenient and can be more cost effective if these extra charges for delays are avoided. In Poland, the manufacturers are stronger financially than the carriers and will continue their practice of buying new trucks for their private use.

These increasing use of not-for-hire trucking in Poland as the result of the factors discussed above has affected not only the nature and costs of transportation but also has added to the inflation. The for-hire trucking sector has forfeited a substantial part of its share of the transportation. Some parts of the for-hire transportation system, particularly the multimodal operations, are being threatened
as the result of these changes. This shifting of traffic to the not-for-hire sector has increased the total costs of transportation because of the lower productivity of the not-for-hire trucking sector. As noted, the not-for-hire trucking sector has higher fuel cost per unit and higher fixed costs. General inflation in Poland has been stimulated by the increasing prices of some raw materials and consumer commodities, price increases partly resulting from the higher costs of transportation.

VIII. Final Observations

This review of the trucking industry in Poland reveals some basic differences and several striking similarities with the trucking industry in the United States. The basic differences, however, reflect some of the fundamental differences between the two countries in areas other than trucking or even transportation. For example, the difference in the nature of ownership of trucking firms, socialized versus privately owned, reflects the substantially different socioeconomic systems of the two countries. The constraint on the Polish trucking industry created by the need and the present inability to import large quantities of liquid fuel is not a factor in the United States. Although the United States imports much of its oil, it has a substantial amount of domestic production and is not suffering from the current economic problems found in Poland which have put reduced its ability to import all goods. The United States experienced similar shortages during the oil embargo in the early 1970s. The difference in the average length of haul can be explained largely by the substantial difference in the sizes of the two countries and a better
developed highway system but less rail accessibility in the United States. The location and size of Poland explain its much greater interest in and concern about international aspects of trucking and transportation in general. The existence of general excess demand in Poland, which has resulted from the poor economic conditions in that country, has produced some of the transportation purchasing decisions in Poland which appear to be somewhat peculiar from an American economist perspective.

When only the transportation factors are considered, the trucking industries in the two countries have many important similarities. In both Poland and the United States (at least before regulatory reform), the not-for-hire trucking sector grew more rapidly during the 1975-1984 time period. In addition, the not-for-hire trucking carriers in Poland and their counterparts in the United States, the private carriers, have higher average costs than the for-hire carriers. The two countries also face many of the same transportation policy issues. For example, the ability of the transportation agencies in both countries to control the trucking industry is restricted because they do not apply economic regulations to all sectors of the trucking industry. In addition, both countries recently introduced economic reforms affecting their respective trucking industries. Although the Polish economy obviously relies much less on the market system for allocating resources than the United States' economy, less government interference in the behavior of firms is the goal of the reforms introduced in both countries. In the United States the movement toward less economic regulation and reduced governmental financial
support of firms, for example, Conrail, resulted from a number of concerns including large budget deficits, the high rate of inflation and inefficiencies found in many regulated industries. The same basic concerns led to the economic reforms introduced in Poland in the early 1980s. Because transportation in the United States is one of the most highly regulated industries, much of the regulatory reform legislation reduced the amount of economic regulation of trucking, airlines, railroads and intercity bus operators.

Although there remains substantial differences between the two socioeconomic systems, both countries have decided that their trucking industries should rely more on the forces of supply and demand and less on the decisions and protections provided by the government. Because the United States introduced its reforms a few years earlier, Poland might be able to learn from the successes and failures that have come from deregulation of trucking in the United States.
References


### Table 1

Modal Structure of Transportation System of Poland in 1975 and 1984

<table>
<thead>
<tr>
<th>Transport Mode</th>
<th>Tons Carried (mm)</th>
<th>1984/1975</th>
<th>1975</th>
<th>1984</th>
<th>Modal Shares</th>
<th>Ton kms Revenues (mlns)</th>
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<tr>
<td>Trucking</td>
<td>1743.0</td>
<td>1420.9</td>
<td>0.82</td>
<td>0.77</td>
<td>0.20</td>
<td>0.74</td>
<td>0.21</td>
</tr>
<tr>
<td>Railroads</td>
<td>464.2</td>
<td>425.5</td>
<td>0.91</td>
<td>0.21</td>
<td>0.67</td>
<td>0.23</td>
<td>0.69</td>
</tr>
<tr>
<td>Waterways</td>
<td>14.9</td>
<td>15.4</td>
<td>1.03</td>
<td>0.01</td>
<td>0.01</td>
<td>0.01</td>
<td>0.01</td>
</tr>
<tr>
<td>Pipelines</td>
<td>30.5</td>
<td>39.9</td>
<td>1.33</td>
<td>0.02</td>
<td>0.09</td>
<td>0.02</td>
<td>0.10</td>
</tr>
<tr>
<td>Others</td>
<td>1.4</td>
<td>1.2</td>
<td>0.86</td>
<td>0.00</td>
<td>0.03</td>
<td>0.00</td>
<td>0.00</td>
</tr>
<tr>
<td>Total</td>
<td>2244.0</td>
<td>1902.9</td>
<td>0.85</td>
<td>1.00</td>
<td>1.00</td>
<td>1.00</td>
<td>1.00</td>
</tr>
</tbody>
</table>

Source: See (6) and (8)
Table 2
The Structure of Polish Trucking Industry (carriers for hire) in Terms of Size and Ownership in 1984

<table>
<thead>
<tr>
<th>Volume of Cars Owned</th>
<th>Number of firms</th>
<th>Share in total (%)</th>
<th>Numbers Owned by</th>
<th>Accumulated Share</th>
<th>State</th>
<th>Cooperative</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>State</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>500 or less</td>
<td>170</td>
<td>76.6</td>
<td>24</td>
<td>146</td>
<td>34.0</td>
<td>97.0</td>
</tr>
<tr>
<td>501-1000</td>
<td>36</td>
<td>16.2</td>
<td>31</td>
<td>5</td>
<td>78.0</td>
<td>100.0</td>
</tr>
<tr>
<td>1001-1500</td>
<td>8</td>
<td>3.6</td>
<td>8</td>
<td>--</td>
<td>89.0</td>
<td>0.0</td>
</tr>
<tr>
<td>1501 or more</td>
<td>8</td>
<td>3.6</td>
<td>8</td>
<td>--</td>
<td>100.0</td>
<td>0.0</td>
</tr>
<tr>
<td>Total</td>
<td>222</td>
<td>100.0</td>
<td>71</td>
<td>151</td>
<td>--</td>
<td>--</td>
</tr>
</tbody>
</table>

Source: See (3)
Table 3
Tons Carried and Ton kms Revenue in Polish Trucking Industry

<table>
<thead>
<tr>
<th>Carriers</th>
<th>Tons Carried (thousands)</th>
<th>1975</th>
<th>1980</th>
<th>1984</th>
<th>ton kms 1984</th>
<th>% of total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>1975</td>
<td>1980</td>
<td></td>
<td>mlns ton</td>
<td>total</td>
</tr>
<tr>
<td>1) Total*</td>
<td></td>
<td>1,743.0</td>
<td>2,167.9</td>
<td>1,421.0</td>
<td>36,577.0</td>
<td>100.0</td>
</tr>
<tr>
<td>2) For Hire**</td>
<td></td>
<td>823.3</td>
<td>1,080.0</td>
<td>606.8</td>
<td>19,797.0</td>
<td>54.0</td>
</tr>
<tr>
<td>2a) State Owned</td>
<td></td>
<td>719.4</td>
<td>939.8</td>
<td>--</td>
<td>--</td>
<td>--</td>
</tr>
<tr>
<td>2b) Cooperative</td>
<td></td>
<td>103.9</td>
<td>140.1</td>
<td>--</td>
<td>--</td>
<td>--</td>
</tr>
<tr>
<td>2c) Public</td>
<td></td>
<td>172.3</td>
<td>236.6</td>
<td>123.9</td>
<td>9,342.0</td>
<td>17.0</td>
</tr>
<tr>
<td>2d) Trucking of trades</td>
<td></td>
<td>651.0</td>
<td>843.3</td>
<td>482.9</td>
<td>10,455.0</td>
<td>29.0</td>
</tr>
<tr>
<td>3) Not for hire</td>
<td></td>
<td>919.7</td>
<td>1,088.0</td>
<td>814.1</td>
<td>16,780.0</td>
<td>46.0</td>
</tr>
</tbody>
</table>

*Total = 2 + 3  
**2 = 2a + 2b = 2c + 2d  
-- = No data

Source: (6) and (8)
Table 4

For-Hire Carriers' Share of Trucking Industry's Fleet and Freight

<table>
<thead>
<tr>
<th>Year</th>
<th>% of fleet</th>
<th>% of tons</th>
<th>% of ton kms</th>
</tr>
</thead>
<tbody>
<tr>
<td>1975</td>
<td>32.0</td>
<td>47.2</td>
<td>57.6</td>
</tr>
<tr>
<td>1980</td>
<td>32.5</td>
<td>49.8</td>
<td>58.9</td>
</tr>
<tr>
<td>1984</td>
<td>21.8</td>
<td>42.7</td>
<td>53.9</td>
</tr>
</tbody>
</table>

Source: (3), (7), (8).
Table 5

Average Length of Haul

<table>
<thead>
<tr>
<th>Trucking Industry:</th>
<th>Average Haul in km</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>For hire</td>
<td>23</td>
<td>24</td>
<td>32.4</td>
</tr>
<tr>
<td>Public</td>
<td>47</td>
<td>47</td>
<td>75.3</td>
</tr>
<tr>
<td>Of trades</td>
<td>17</td>
<td>18</td>
<td>21.7</td>
</tr>
<tr>
<td>Not for hire</td>
<td>15</td>
<td>17</td>
<td>20.6</td>
</tr>
<tr>
<td>Total</td>
<td>19</td>
<td>21</td>
<td>25.8</td>
</tr>
</tbody>
</table>

Sources: (6), (8)
Table 6
Productivity Per One Truck in 1975 and 1984

<table>
<thead>
<tr>
<th>Content</th>
<th>Unit</th>
<th>1975</th>
<th>1984</th>
<th>1975</th>
<th>1984</th>
<th>1984</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>For Hire</td>
<td></td>
<td>Not for Hire</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Productivity</td>
<td>tons</td>
<td>1060</td>
<td>633a)</td>
<td>863</td>
<td>427b)</td>
<td></td>
</tr>
<tr>
<td>per 1 t capacity</td>
<td>tonokm</td>
<td>24311</td>
<td>20465</td>
<td>13196</td>
<td>8796</td>
<td>233.0</td>
</tr>
<tr>
<td>Technical efficiency</td>
<td>% of fleet</td>
<td>0.770</td>
<td>0.741</td>
<td>0.713</td>
<td>0.671</td>
<td>115.0</td>
</tr>
<tr>
<td>Average time in work</td>
<td>hours/1 truck</td>
<td>2400</td>
<td>1998</td>
<td>1700</td>
<td>1570</td>
<td>150.0</td>
</tr>
<tr>
<td>yearly</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Average haul yearly</td>
<td>km/1 truck</td>
<td>35470</td>
<td>33407</td>
<td>24230</td>
<td>23036</td>
<td>154.3</td>
</tr>
<tr>
<td>Average stoppage</td>
<td>min/1 ton</td>
<td>--</td>
<td>8.31</td>
<td>--</td>
<td>11.0</td>
<td>75.5</td>
</tr>
</tbody>
</table>

Source: (2), (3), (8)

1) Explanation of content of particular coefficients—see (4).

a, b Including small trucks, which capacity was 1 ton and less.

c Quotient of ready to work amount of cars and total fleet.
Table 7

Traffic Allocation to Types of Trucking Services

<table>
<thead>
<tr>
<th>Organizational System</th>
<th>Trucking industry totally</th>
<th>Kind of carriers (in tons)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>mln tons</td>
<td>%</td>
</tr>
<tr>
<td>Regular haulage of LTL</td>
<td>0.8</td>
<td>0.0</td>
</tr>
<tr>
<td>Service of rail terminals</td>
<td>87.9</td>
<td>6.2</td>
</tr>
<tr>
<td>Centralized services of shippers</td>
<td>91.0</td>
<td>6.4</td>
</tr>
<tr>
<td>Trades' carriages</td>
<td>317.9</td>
<td>22.4</td>
</tr>
<tr>
<td>Hiring trucks</td>
<td>169.2</td>
<td>11.9</td>
</tr>
<tr>
<td>Self service</td>
<td>754.1</td>
<td>53.1</td>
</tr>
<tr>
<td>Total</td>
<td>1420.9</td>
<td>100.0</td>
</tr>
</tbody>
</table>

Source: (2), (3).
Fig. 1. Firms' Size Structure.

Trucking industry for hire.

Classes of firms:
1 - lower than 500 vehicles owned,
2 - 501 - 1000 vehicles owned,
3 - 1001 - 1500 vehicles owned,
4 - 1501 vehicles and more.
Fig. 2. Polish Trucking Industry.


- □: Ton-kilometers revenue total
- •: Tons carried total
- +: Tons carried by carriers for hire
- △: Tons carried by carriers not for hire.

Years:
- 1975
- 1980
- 1982
- 1984

Dynamics in %, 1975 = 100.