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Historical Development of the U.S. Trucking Industry: Legislation or Ecology

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Historical Development of the US Trucking Industry: Legislation or Ecology?

ABSTRACT

This paper examines the ecological processes that underlie historical developments in the evolution of the US trucking industry. Empirical findings support the influence of ecological phenomena on demographic and policy changes. The growth trend occurring in the late 1970s especially highlights this exchange. Thus, the analysis of the ecological processes of density dependence and resource partitioning in the industry's evolution challenges the political-economic bias in the traditional account of this industry's development. This paper is presented in four major sections: 1) a historical review of the trucking industry; 2) a theoretical review of organizational ecology; 3) an ecological analysis of the demographic changes in the industry; 4) a concluding discussion.
INTRODUCTION

As one of the most regulated industries in the history of the US economy, trucking is conventionally studied in terms of its implications for the role of government in industry. Regulatory policies are continually cited as the motivator for the changes in this industry's demographic patterns. But does this political-economic bias give a comprehensive narrative of industry developments? This paper attempts to challenge and supplement the dominant historical account of US trucking by examining the processes of organizational ecology which underlie industry trends. Specifically, I will analyze the influence of density dependence and resource partitioning relative to public policies. This paper is organized into four primary sections. I begin with a review of the historical background of the trucking industry followed by a theoretical overview of organizational ecology. The content of these two sections serve as tools in the third section, which discusses the ecological processes in trucking's evolution drawn from my data analysis. The final section offers qualifiers for my research as well as a discussion of potential extensions.

HISTORICAL BACKGROUND--THE US TRUCKING INDUSTRY

From 1900 to 1990, the political-economic account of the history of US trucking is marked by three main periods, each defined by its regulatory environment. 1) The trucking market (1900-1935), the preregulatory period during which changing market conditions--such as railroad decline, tractor industry\(^1\) innovations, and institutional support--led to the founding of thousands of trucking companies. 2) The regulated era (1935-1980), during which the federal government appointed the Interstate Commerce Commission (ICC) to control industry dynamics. The ICC limited new entries and regulated rates to prevent inequities among truckers. These policies cramped competition

\(^1\)Trucking requires two main equipment components: the tractor and the trailer. The tractor is the power unit of the truck with the engine and the cab, sometimes referred to as the truck head. The trailer is the bed or container which stores the freight during shipping. In this context, the tractor industry is the sector of the automotive industry which produces truck heads.
and later fostered trucking consolidation. 3) *The deregulatory era* (post-1980), during which Congress deregulated prices, entries, and mergers to regenerate industry competition and service efficiency. The result was a surge in new trucking companies which more than doubled the size of the industry. The following section reviews the political-economic history of the trucking industry.

**Period 1: The Trucking Market (1900-1935)**

In the early decades of the twentieth century, cross-country trucking expanded due to emergent commercial conditions. This section will provide a brief overview of the factors of railroad decline, automotive growth, and public and financial sector support involved in this process. It will then review the competitive pressures that arose from industry growth.

First, the decline of the railroad industry during this period was pivotal to the formation of the trucking market. Between 1890 and 1933, anticartel and antitrust legislation forced railroad companies to abandon cooperative price-fixing policies and rate wars ensued (Dobbin, 1995). The result was an unprecedented number of rail company failures and acquisitions throughout the industry. In addition, economic conditions during the Great Depression changed the needs of commercial shipping. As the national economy stagnated, drayage demands become increasingly sporadic and shipment sizes consistently fell below rail cargo specifications (Childs, 1985). The rigidity of railroad operations, however, prevented the rail industry from altering service schedules and lowering cargo size requirements to accommodate these changing conditions. Thus predatory pricing among rail companies combined with the inflexibility of rail operations caused service deficiencies. As the number of railroad companies plummeted, shippers were left to ask which mode of freight transport could fill these deficiencies.

Second, during the same period, the American automotive tractor industry experienced tremendous growth. Public enthusiasm for automotive vehicles in general
heightened their social acceptance and raised entrepreneur investments (Carroll and Hannan, 1995). In turn, entrepreneur investments yielded technological and manufacturing innovations, making tractors more affordable. Both factors generated enthusiasm over the potential of truck usage in transportation, leading tractor manufacturers to overproduce in the 1920s (Childs, 1985). The resulting surplus deflated truck prices.

The growth of the trucking market was thirdly fueled by institutional factors (Childs, 1985). Specifically, government-funded highway construction made trucks increasingly accessible to shippers and consumers nation-wide. Further, the financial sector supported lenient loan terms for tractor purchases. These conditions allowed trucking companies to offer commercial shippers flexible service at low shipping rates.

Industry and institutional factors quickly expanded the use of trucking into long-distance carriage, positing trucking as a popular solution to the transportation deficiencies left by the declining railroad industry. Once trucking companies established this market reputation, substantial industry growth followed. Industry estimates show a gradual rise in the number of trucking companies entering the market from 1913 through the 1920s. This growth then accelerated in the 1930s. The rapid increase in the number of firms entering the trucking market stimulated acute competition.

Industry competition was further heightened by external factors. Surface transportation expansion, via rail, air, and truck, resulted in a surplus of transportation facilities by the 1930s. Contrasted with sharp declines in available freight in the early 1930s due to the Depression, these conditions pitted the various industries against each other in competition over market shares. The addition of outside competition from the rail and air carrier industries lowered the market share for trucking and intensified competition within the trucking sector.

Competitive pressures caused truckers to: a) engage in price wars that rendered rates unpredictable b) cut corners in trucker safety and cargo insurance to reduce rates and
c) charge discriminatory rates that hurt shippers of particular commodities and routes (Childs, 1985; Lieb, 1981; Rothenberg, 1994; Wyckoff and Maister, 1977). These practices destabilized the industry. Subsequently, industry occupants and constituents began to lobby for regulations in industry growth and operations in the 1930s.


Railroad companies, extant trucking companies, commercial shippers, and labor organizations all favored trucking regulations for different reasons. The railroad companies advocated regulatory reform expecting legislation to even the playing field to restore the competitive advantage of the rail sector. Trucking firms and industry associations hoped regulation would curb competitive pressures and eliminate the price wars, allowing trucking rates to rise to a profitable level. Shippers favored reforms, despite increases in trucking rates, to restore quality and reliability in service, enforce insurance requirements, and standardize rates. Labor organizations of truckers looked to public policy to establish safety regulations and limits on work hours and work conditions (Johnson, 1973). By combining their lobbying efforts, these four groups successfully brought about federal industry regulations.

In 1935, Congress passed the Motor Carriers Act (MCA), giving the Interstate Commerce Commission (ICC) jurisdiction over the trucking industry. The MCA addressed four primary concerns: 1) provided rate stability for truckers and shippers by eliminating price wars and price discrimination; 2) raised the accessibility of quality trucking services to all shippers; 3) provided a safe environment for trucking operations; and 4) achieved uniformity in regulatory laws, both with the trucking industry and between trucking and the other transportation industries.

The MCA of 1935 restructured the nature of industry operations and established the basic organizational structure and policy guidelines used by the ICC to regulate the industry for the next 45 years. In particular, the 1935 Act established:
1) distinct subcategories for truckers;
2) entry barriers via ICC certification;
3) rate stability through the publication of and adherence to rates;
4) control over mergers and acquisitions among trucking companies;
5) a minimum insurance requirement for all truckers;
6) uniform accounting procedures among trucking companies;
7) service consistencies by banning discriminatory service preferences;
8) safety regulations for trucking operations. (US Congress, 1935)

With these provisions, the ICC regulated the industry environment to protect truckers and shippers from the competition experienced in the early 1930s.

This paper is concerned with the largest of the three subsectors defined by the MCA, formally referred to as the common motor carriers of property.\(^2\) Within this subsector, trucking companies are further categorized into Class I, Class II, and Class III companies—largest, large, and small respectively—according to their annual operating revenues. In this section, I will discuss the four regulatory provisions most relevant to my study of the trucking industry.

First, the main purpose of the MCA of 1935 was to curb trucking competition by using strict entry barriers to form an industry-wide cartel.

We think that, in order to foster sound economic conditions in the motor carrier industry, existing motor carriers should normally be accorded the right to transport all traffic which they can handle adequately, efficiently, and economically in the territories served by them, as against any person now seeking to enter the field of motor carrier transportation. (MCC, 1936)

The Act granted “grandfather clause”\(^3\) certification to extant trucking companies while making it difficult for new trucking businesses to start. To obtain certification, new business applicants were required to demonstrate a “present or future public convenience and necessity” demanding their services. In addition, applicants were required to prove

\(^2\)A Common Carrier of property is formally defined as “any person which holds itself out to the general public to engage in the transportation by motor vehicle in interstate or foreign commerce of property of any class or classes thereof for compensation.” For the sake of clarity, such carriers will be referred to throughout this paper by the vernacular terms of TRUCKER and TRUCKING COMPANIES.

\(^3\)Under Section 206 of the Motor Carrier Act of 1935, applicants in bona fide operation on June 1, 1935, would obtain transport authority under the grandfather rights clause without undertaking elaborate ICC applications. This was the easiest means to certification, and indeed, the majority of the firms who were allowed in the trucking industry were grandfather clause firms.
that there was both an unfulfilled public need for their transportation services and enough
demand that their operation would not divert revenues from existing truckers. For
decades, the ICC maintained that the threat of additional competition was a valid reason
to deny entry to new applicants.

Second, in addition to entry restrictions, the ICC also limited firm expansion.
Post-1940, foreign and domestic trade increased from World War II and revitalized the
demand for freight services. Truckers attempted to diversify their operations to take
advantage of this demand shift. Since the ICC determined the routes and commodities
served by each trucking company, firms that wanted to add new routes or goods had to
obtain Commission approval. However, applications to expand services were typically
denied because of the potential competition they would generate (Lieb, 1981). The ICC
preferred to approve unification among existent firms to serve wider client bases
(Johnson, 1973). Thus, “consolidation, merger, purchase, lease, operating contract, [and]
acquisition of control” were the principle ways to diversify the operations of regulated
truckers (US Congress, 1935).

Third, the ICC required truckers to publish and abide by ICC approved service
rates. Although this policy reduced the autonomy of independent truckers to establish
their own rates, it brought industry prices to a profitable equilibrium.

Fourth, the ICC mandated trucking companies to adopt service obligations in
exchange for the non-competitive, regulated environment. Truckers could not refuse
service to any shipper, on any route, transporting any commodity, who was prepared to
pay the published rate. Unlike in an unregulated industry, trucking companies could not
practice discriminatory service strategies by maximizing shipments that yield higher
revenues while avoiding less-profitable movements. This obligation of consistent service
to all shippers secured trucking access for smaller, remote communities across the country
that may otherwise have been ignored.
The MCA of 1935 triggered two observed long-run trends in the trucking industry from 1940 to the late 1970s. Limiting entries and favoring merger and acquisitions led to industry concentration and an overall reduction in the number of companies in the industry from 26,558 companies in 1940 to a low 16,606 firms by 1977 (ICC, 1940; ICC, 1977). The non-competitive environment of the trucking industry during the regulatory period resulted in rate inflation among truckers. Artificially high rates fed the growth in total operating revenues to over 8000% by the late 1970s.\(^4\)

By the late 1970s, the number of available truckers became glaringly disparate compared to the volume of available freight. Sentiments in favor of deregulation arose out of the fear that the declining supply of truckers would not be able to meet the rising demands of commerce. For shippers, consolidation within the industry meant a limited choice of truckers offering monopolistic rates for mediocre service. They saw deregulation as the best means to restore quality performance, competitive prices, and increased services. Investors also pushed for deregulation to remove entry barriers into the lucrative market. However, extant trucking companies rallied against deregulation and warned that competition would once again destabilize the industry. Despite their petitions, the reform climate of the Ford and Reagan administrations resulted in industry deregulation.


Finding the existing regulatory structure responsible for “inhibiting market entry, carrier growth, [and] maximum utilization of equipment and energy resources... resulting in some operating inefficiencies and some anticompetitive pricing” within the trucking industry, Congress passed the Motor Carrier Act (MCA) in 1980 which focused on entry criteria and rate freedom in the trucking industry.

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\(^4\)Operating revenues in this comparison were calculated in 1939 dollars.
Under the 1980 Act, the only entry requirement was proof of the applicant's fitness and willingness to provide transportation service. It restricted the Commission from ruling the "diversion of revenue or traffic from an existing carrier to be in and of itself inconsistent with the public convenience and necessity" (US Congress, 1980). The ICC could no longer refuse certification to new applicants for the sake of avoiding competition.

Removing entry barriers resulted in an explosive increase of new entrants to the trucking industry post-1980. Statistics show a near 250% increase in the number of trucking companies from 1980 to 1990 alone. In 1980, the total number of ICC certified truckers was 17,721 (ICC, 1980). By the end of the decade, this count reached 44,148 trucking firms (ICC, 1989). The industry was clearly on the rebound. What caused this revitalization? After four decades of contraction, how can this sudden growth occur? Were the trends that we have tracked strictly dependent on federal policies? Or can they be better understood using other theoretical frameworks? The remainder of this paper focuses on this subject.

**ORGANIZATIONAL ECOLOGY**

The broad question is: how can the theories in organizational ecology expand our understanding of the demographics observed in the trucking population. In this section, I begin with a review of the basic components of the organizational ecology framework. Then, constructs used in density dependence and resource partitioning theories are elaborated in order to address the question posed.

Ecological approaches differ from other accounts of organizations in two significant ways: the unit of analysis, and the emphasis on selection. While most organizational theories use the singular organization as the unit of analysis, ecology expands the unit to the population of organizations. An organizational population consists of a set of organizational forms (Hannan and Freeman, 1989). These forms are
analogous to species in bio-ecology that are defined by their genetic codes. The core properties of an organizational form are the functional equivalents of genetic codes. Hannan and Freeman suggest four core properties to distinguish between forms: 1) the stated goals of the form; 2) the authority used by the form to carry out operations; 3) the core technologies used to perform tasks; 4) the marketing strategy of the form. Organizations that share a form share common environmental dependencies and are similarly affected by changes in the material and social environment. The set of organizations with a particular form in a specific social setting constitutes the organizational population. For example, a trucking company is an organizational form, the set of trucking companies in the US during 1900-1990 is an organizational population.

From this perspective, organizational populations resemble industries in many respects. However, it is theoretically important to note the difference because the definition of the organizational population is a fundamental part of niche theory. In economics, firms who compete with one another over the consumer’s preference for a product (or its substitute) make up an industry. The ecological definitions of an organizational population does not begin with the consumer. Rather, it starts with the producer and the institutional, legal, and structural factors that determine the producer’s place in a market (Carroll and Hannan, 1995). These factors constitute the fundamental niche, the set of all environmental conditions, that can sustain the producing organization. Of course, organizations rarely operate in a vacuum and have access to all environmental resources. Instead, their fundamental niche usually overlaps with that of other organizations, placing them in competition with those organizations. Competition then pushes organizations to establish a realized niche—a subset of environmental conditions—where growth is possible. The organizations in this realized niche constitute the organizational population. Therefore, organizational ecology uses a broader and more dynamic approach to defining organizational populations than economics uses for industries.
Note that I have used two approaches to define an organizational population: the core properties of an organizational form and the niche. Both approaches are necessary because the combination of resource abundance and constraints that comprise a population’s niche is often hard to define. Since the four core properties are related to the resources and conditions that are required by the organizational form, they can be used to discern the niche of the form as well. The use of the organizational form to define the niche will be a key tool in my analysis.

The second distinguishing characteristic of the ecological perspective is its emphasis on environmental selection. Other organization theorists study ways in which internal management can change organizations to increase their adaptability to changing environmental conditions. Ecologists argue that inertial pressures make it very difficult for organizations to alter their structure or functions to suit emergent conditions. Therefore, changes in the organizational landscape do not come from adaptation of old organizational forms to new conditions. The environment selects new organizational forms that can better meet the new criteria to replace the old forms (Hannan and Freeman, 1989). The process of selection causes the vital rates of organizational populations to fluctuate. Vital rates include the rate at which new organizations arise, the rate of organizational growth and decline, and the rate of organizational mortality. Changes in vital rates ultimately determine the demographics of the organizational population. Therefore, these demographics reflect the process of environmental selection. With an understanding of this basic framework, we are now equipped to discuss two of the dominant theories concerning selection in organizational ecology.

**Density Dependence**

I will begin with the theory of density dependence (Hannan and Freeman, 1989). According to this model, trends in long-term organizational evolution are caused by the opposing processes of legitimation and competition. Legitimation occurs when an
organizational form sheds its novel status and becomes a widely accepted, taken-for-granted means of accomplishing a task. Competition is the indirect and diffuse pressure that results from many organizations targeting the same finite resources. Because it is difficult to operationalize legitimation and competition directly, ecologists measure legitimation and competition as second order effects of population density. Population density is the number of organizations in a population at a specific time. The density of an organizational population fluctuates according to the founding rate of new organizations and the exit rate of established organizations. In this model, density has a strong effect on legitimation and competition and can therefore be used as a surrogate measure of these processes.

Density dependence theory predicts that organizational evolution is driven at first by legitimation, and later by competition, leading to nonmonotonic effects on both the founding and mortality rates. Upon inception, new organizational forms experience difficulties in mobilizing resources for their operations, thus founding rates are low while mortality rates are high. As the number of organizations belonging to this population increases, the legitimacy of the organizational form also increases. The key effect of legitimation is that it opens up resource pools for the organizational population. Increased accessibility to resources in turn raises the rate of new foundings and lowers the rate of organizational failures. However, this positive correlation between density and organizational foundings through the effects of legitimation diminishes as populations grow in size, until it is no longer possible for new organizations to increase the taken-for-grantedness of the population. As the population approaches the carrying capacity of the niche and begins to exhaust its resources, competitive pressures increase exponentially with population density and significantly lowers the founding rate while raising the mortality rate. The result is a shake-out in the number of organizations in the population, lowering its overall density. In other words, the effects of legitimation and competition lead to an inverted U-shaped pattern in organizational foundings that mirrors an upright
U-shaped pattern of organizational failures. Ecologist use these patterns to indicate the selection process which shapes the evolution of the population. Below is the general pattern of the evolution of a population's density predicted by this theory.

**Resource Partitioning**

A second theory offers a different view on selection in organizational populations. Developed by Carroll (1985), the theory of resource partitioning discusses how industry concentration affects specialist and generalist organizations in different ways. The model is based in the ecological constructs of realized niche and niche width. In this context, generalist organizations rely on a wide range of environmental resources for sustenance. Such organizations compete in a variety of domains simultaneously without special emphasis in any particular domain. Generalists also tend to be locally diversified, undertaking a spectrum of activities in the local industry. Therefore they are organizations with middle-of-the-road strategies intended to exploit the widest niche of the market.

On the other hand, specialist organizations operate in a narrow range of environmental resources. Their strategy is to concentrate on serving a narrow and specific domain within the realized niche. If resources are evenly distributed throughout the niche, than specialist organizations will typically be smaller than generalists, since they operate in subsets of the resource environment used by generalists.

Thus far in this theory's development, the process of resource partitioning is predicted to occur only in industries that satisfy a certain set of conditions, these prerequisite conditions represent the basic assumptions of organizational ecology. First, organizations in the population are inert. They are inefficient at changing their core properties to adapt to new environmental conditions. Next, the resource environment supporting the population is finite. Also, the industry favors economies of scale. Finally, there is no real price competition among the organizations and consumer demands
are heterogeneous. It is within this backdrop that resource partitioning has been most often reported.

According to Carroll’s model, when the market is crowded and competitive, organizations will use a generalist approach to try to dominate the center of the market. However, this is not a pure generalist portrait because competition forces organizations to adopt some element of specialization to distinguish themselves from other organizations, giving us organizations that appear as hybrids between generalists and specialists. Over time, some generalist organizations develop large economies of scale, increasing their competitiveness. Smaller generalist organizations are then squeezed out of the core market as large generalists begin to concentrate in this center niche. Concentration reduces market crowding and frees up pockets of resources in the periphery of the market abandoned by large generalists. Specialist organizations are able to absorb these resources and grow in the peripheral regions without competing directly with large generalists. Hence the resources in the market have been partitioned into two sectors.

In theory, the independent variable is the level of generalist concentration in the market, and the dependent variable is the number of specialist organizations. To summarize, resource partitioning predicts that the higher the level of concentration among industry generalists, the higher the survival rate of specialists, and the larger the specialist population will be. Ecologists use this theory to account for resurgence in the density levels of mature industries, or industries that have undergone the shake-out period.

**DATA ANALYSES AND CONCLUSIONS**

The US trucking industry is commonly studied as the archtypical example of a regulated industry in reference to the political-economic debate over government’s role in the economy. As we have seen, the ICC clenched this industry in its formative period and maintained tight controls until recent years, making trucking one of the most regulated industries in the US economy. But have regulatory reforms fully dictated industry
dynamics? Or were they underscored by a broader evolutionary process within the organizational population? In taking an ecological magnifying glass to the trucking industry, I will examine the effects of regulatory constraints on the process of natural selection and the effects of natural selection on public policy. In this section, I will first define the trucking niche through its organizational form. Then I will discuss the roles of density dependence and resource partitioning in trucking's development with reference to changes in its organizational form, or niche.

Before the regulatory era, four core properties characterized the organizational form of trucking companies:

1) goal: provide broad commercial transport by motor vehicle for profit;
2) authority structure: direct transactions between truckers and shippers;
3) technological core: the individual tractor with variable trailer sizes;
4) marketing strategy: regional orientation, with a special appeal to small shippers neglected by the railroad companies.

With these properties, the trucking form was more responsive to the economic demands of the 1920s and early 1930s than railroad companies. Variable trailer sizes allowed truckers to accommodate smaller shipments during the Depression. Direct trucker-shipper transactions made order-specific deliveries easy to coordinate. Independently operating trucks had the necessary flexibility to carry sporadic shipments. These conditions constituted the trucking niche between 1900 and 1935.

Density dependence theory accounts for the steady rise in the number of trucking companies from 1900 until the regulatory period. Public enthusiasm, entrepreneurial interests, and responsive service increased the acceptance of trucking as a transport mode. In accordance with density dependence predictions, form legitimacy opened resource pools to fuel industry growth; such as the government funded highway construction projects, low interest-rate loans for tractor purchases, and increased shipper interest in
truck transport. Subsequently, the density of the trucking population rose from less than 200 in 1910 to 14,693 by 1935 (refer to Figure 1).

Diffuse competition increased at a negligible rate compared to legitimacy and organizational founding before the 1930s. However, as the density of the trucking population increased and the industry approached its carrying capacity, competitive pressures in trucking surged. Diffuse competition rose exponentially with the addition of each new trucking company in the 1930s, as seen in the price-cutting strategies prevalent throughout the industry during this period. According to Hannan's theory (1989), at density levels near the carrying capacity, competition will retard the founding rate and raise the mortality rate of trucking companies, leading to a drop in the overall size of the industry. However, this process did not occur in the trucking population. Instead, industry actors and their constituents manipulated industry dynamics by instating the Motor Carrier Act in 1935. This legislation cartelized the industry by virtually sealing off foundings and reducing competition to abate trucking mortalities. Statistics show a virtual stagnation in industry vital rates. The MCA of 1935 intervened in ecological processes and curbed the density shake-out, modifying the predicted ecological patterns of competition and population evolution.

Here, the theory of density dependence does not apply to the trucking population in its pure form. However, the theory could be strengthened if it was revised to incorporate an analysis of the effects, short-run and long-run, of external factors on the evolutionary process. This is an arguably significant step for the theory because most major industries experience the imposition of regulatory policies during their development. Thus, expanding the density dependence theory to account for these factors would greatly increase its applicability.

Although the density model does not fully account for the statistical patterns in the trucking industry, strong evidence for the existence and impact of ecological processes

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5Refer to the section entitled "The Trucking Market" for a detailed discussion of these empirical factors.
are nonetheless prevalent. A striking example lies in the sizable resurgence in the number of trucking firms in the mid 1970s. Recall from the historical discussion that the regulatory constraints established by the MCA of 1935 were not removed until June of 1980. However, the density of truckers resurged in 1977 and increased exponentially by 1980. How was this possible given the strictness of the regulatory policies in the trucking industry? Since the regulatory environment did not change until 1980, we cannot find the answer to this question in public policy developments. On the other hand, the ecological perspective offers a powerful explanation for this trend, particularly Carroll’s (1985) theory on resource partitioning.

Resource partitioning is based in the ideas of realized niche and niche width. Therefore, my discussion--of the development of resource partitioning in the regulated era and how it revitalized the population in the 1970s--will begin with a review of how the MCA affected the trucking niche. Then I will analyze industry statistics to highlight the partitioning process empirically. Finally, I will use this analysis of resource partitioning to challenge the conventional view of political-economists that public policies have dictated trucking’s evolution.

First, here is a note about my operationalization. Recall that the ICC divided trucking firms into 3 categories according to their gross operating revenues. Over the course of the past six decades, these categories have been redefined four times to account for inflation and the overall growth of the industry. Continual redefinitions complicates the distinctions between the classes and renders these classifications difficult to apply in my analysis. However, despite these categorical shifts, one characteristic has remained constant. Class I and II firms are typically comparable in size whereas Class III firms have remained significantly smaller. This characteristic allows me to operationalize the three classes by transferring them to two nominal categories, Class A and Class B. Class A represents the large trucking companies categorized by the ICC as Class I and Class II.
Class B represents the smaller, Class III, trucking companies. This will be a reference point in the discussion of niche width in resource partitioning.

The MCA of 1935 altered the way in which truckers realized and exploited their niches by claiming jurisdiction over operating rights; such rights included the types of commodities a trucking company could carry and the specific routes over which it could carry these commodities. By exercising tight control over the allocation of operating rights, the ICC minimized inter-firm competition and stabilized the industry. Though economic conditions improved after 1940 and greatly expanded the market for trucking, the ICC continued to be strict in its allocative policies. Recall that the ICC preferred to encourage extant firms to merge in order to accommodate increased demand rather than grant them expanded operating rights. Consequently, the larger firms in the industry that transported a wide range of commodities over extended regions came about via unification. The companies that did not merge and were not involved in acquisitions with other companies continued to serve very limited commodities and routes, and thus remained small. Therefore, the sizable difference in operating revenues reported by Class A and B companies are indicative of a difference in their fundamental business strategies. In other words, Class A and B firms are not only differentiated by size, but more importantly, by their core organizational properties.

Specifically, the Class A organizational form is characterized by:

1) goal: provide interstate, nationwide service for general commodities;
2) authority structure: a broad-based operating authority derived from the linking of numerous companies and their individual authorities;
3) marketing strategy: focused on interstate shippers.

Given these characteristics, Class A companies correspond with the generalist organizations defined by Carroll. Like generalists, Class A truckers have a wide niche, are locally diversified, and exploit the broadest market. In contrast, the Class B organizational form is marked by:
1) goal: provide local and regional service for specialized commodities, such as household and hazardous goods;  
2) authority structure: ICC allocated operating authorities limited to certain commodities and routes;  
3) marketing strategy: none; region-specific monopolies of specified commodities and routes supplanted extensive marketing.

Class B firms resemble specialist organizations in that they operate in a narrow domain within the trucking niche, they are typically smaller than Class A companies as a result. Therefore, in response to ICC policies, two subforms emerged in the trucking population. The following section will examine how these two subforms empirically affected the evolution of the industry.

Figure 1 graphs the density of the aggregate trucking population from 1910 to 1990. The graph shows a steady decrease in the number of truckers in the industry from 1940 to 1975. This density decline is not explained by high rates of firm exits via bankruptcy. In fact, failures in the trucking industry were rare due to the institutional supports established by the ICC to protect firms against competition. The average annual number of trucking bankruptcies fluctuated in the teens throughout the regulated period. Additionally, gross operating revenues have increased annually since 1939 (refer to Figure 3).

What, then, accounts for the decrease of the population by 9,553 trucking firms in this period? My analysis points at industry consolidation. Figure 2 graphs the growth trend of Class A firms against that of Class B firms from 1939 to 1990. Two key patterns are revealed. First, the number of Class A companies increased by nearly 350% from 1,202 in 1940 to 3,554 by 1975. Second, this pattern corresponds to a decrease in the number of Class B firms from 25,350 in 1940 to 12,450 by 1975, as well as a contraction in the overall density of the aggregate trucking population. These trends outline the first stage of resource partitioning in which competition within a crowded population favors generalist forms and limits the fitness rate of specialists. Thus
selection processes led to the crowding out of Class B organizations and the proliferation of Class A companies.

By 1975, the density of generalist firms in the trucking industry reached its peak. Intensified competition prompted Class A firms to seek further mergers in order to develop larger economies of scale to remain competitive. As a result of consolidation, between 1975 and 1980, Class A numbers declined and the surviving A carriers moved to dominate the niche core. As Class A companies abandoned the periphery of the market, Class B firms were able to exploit the transport demands of the smaller shippers—who required responsive, flexible, local and regional services—comprising this segment of the market. Statistics synthesized in Figure 2 show that the number of Class B companies rose from 12,450 in 1975 to 14,610 by 1980, concurrent with a decrease in the density of Class A firms. Thus, corresponding to the predictions of resource partitioning, as the level of concentration among generalists increased, the survival rate of specialists also increased, leading to a growth in the size of the specialist population. This results from a partitioning of the resources in the trucking niche into two sectors, allowing Class B companies to operate without direct competition from Class A companies. Consequently, the aggregate population of trucking companies increased by 616 carriers in this period, the highest recorded growth since 1939.

By understanding the process of resource partitioning in the trucking industry, it is possible to challenge the political-economic interpretation of its historical development. The upward growth trend reported in recent decades is commonly attributed to the deregulation of the industry in 1980. According to this argument, deregulatory legislation removed the barriers to entry that had prevented the industry from growing since 1939. As a result, new trucking companies entered the industry and dramatically increased the number of operating trucking firms within the last twenty years.

However, as my analysis reveals, the resurgence in the population density of trucking companies began in 1975, five years before industry deregulation. Thus it is
inaccurate to credit changes in public policies in the reform climate as the catalyst for changes in industry dynamics during this period. Rather, the ecological process of resource partitioning played a primary role in changing the vital rates of Class A and Class B companies, leading to the increase in overall density beginning in 1975 despite strict legislative barriers. Increased partitioning and redistribution of resources to the peripheral niche placed pressure on public policies and stimulated the movement—led by shippers, Class B companies, and potential trucking entrants—for industry deregulation. By deregulating trucking, the MCA of 1980 legitimized the growth in the Class B niche and altered the resource environment to complement the competitive release of trucking companies brought on by resource partitioning. As a result, the total density of the aggregate trucking industry increased by 250% from 17,721 in 1980 to 41,322 by 1989, a trend entirely accounted for by the increase in Class B firms.

From this analysis, I argue that an understanding of ecological phenomena is required for a comprehensive depiction of industry developments. The theory of density dependence provides an insightful account of the factors which contributed to initial growth trends in the trucking population. In 1935, truckers and industry constituents manipulated ecological patterns through the imposition of regulatory constraints. Thus, post-1935, legislative policies have significantly influenced the evolution of this industry. However, as the 1970-resurgence example highlights, it is not the driving force behind empirical trends. Despite regulatory efforts, certain patterns predicted by ecological theorists nonetheless surfaced to dictate trucking dynamics, eventually leading to changes in the legislative environment. Therefore, the historical development of the US trucking industry is characterized by the tug-of-war between political-economic actors attempting to control their resource environment and underlying ecological forces leading evolution in predicted directions. Neglecting either side of this dynamic, as is done in the traditional portrayal of the trucking industry, will result in an inaccurate understanding of industry history leading to biased predictions of future trends.
DISCUSSION

The scope of the research presented in this paper was limited to industry developments prior to 1990 because the quality of documentation available in the deregulated era is not as complete. However, further investigations may attempt to examine statistical data post-1990 for evidence of density decline in this decade. This may reveal a second pattern of density-dependent evolution with emphasis on the effects of diffuse competition on industry development. Recall that this was not observed in the earlier history of the industry due to externally imposed regulatory criteria which altered the environmental conditions of the population.

Additionally, an interesting comparative study could be undertaken regarding the evolution of the motor carriers of agricultural property industry. These carriers were exempt from ICC regulations due to the lobbying of agricultural interest groups during the formative stages of the Motor Carrier Act of 1935. Thus, it stands as an unregulated subsector of a heavily regulated industry. A parallel analysis drawn from this subsector may offer an informative perspective into the actual effects of environmental regulation on the motor carrier industry and the ecological processes that underlie industry dynamics.
Figure 1. Density of Common Motor Carriers of General Property
Aggregate of All Classes
Figure 2. Compared Densities of Class A and Class B firms
Figure 3. Gross Operating Revenues of Class I Common Carriers of General Property

Gross Operating Revenue in Millions

Year
REFERENCES


