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Corporate Demography and Empirical Industrial Organization: A Critical Appraisal

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Corporate Demography and Empirical Industrial Organization:  
A Critical Appraisal\*

March 4, 2002

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Abstract

The emerging field of corporate demography views corporations and industries in a similar way to human or animal individuals and groups. In spite of a surprisingly large overlap of subject matter with economics, corporate demography is not well-known by, nor easily accessible to economists. An extremely useful recent book, The Demography of Corporations and Industries, by Glenn R. Carroll and Michael T. Hannan (2000) should change that. This review essay critically examines corporate demography from an economic viewpoint. The very different view of competition in corporate demography gets particular attention.

Key words: entry, exit, demography, survivor analysis, firm growth

JEL classifications: L11, L22, A12, D23, C81, M14

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I. Introduction

Little known to economists, an alternative approach to studying corporations and industries has recently developed. This parallel approach, called corporate demography or corporate ecology, has roots in both human (and animal) demography and in sociology. The literature generated by this demographic approach is sprawled over a diverse set of sociological and management journals. Reflecting the newness of the field, many publications are in books and conference proceedings. It would be daunting indeed for a economist to wade through this diverse literature to see what is useful for economic research and understanding. It is tough enough to be a decent scholar in one's own field. But, the publication of an important new book, The Demography of Corporations and Industries, by Glenn R. Carroll and Michael T. Hannan (2000) vastly simplifies the effort. (Carroll and Hannan are sociologists at the business schools of Berkeley and Stanford respectively.) This book synthesizes this rapidly growing literature and

makes an argument for its importance and usefulness. The book has been discussed in a review article by Boyan Jovanovic (2001). It provides fascinating insight into what an economist might consider a parallel world.

It turns out to be surprisingly difficult to say what the new approach of corporate demography is. It uses a collection of traditional statistical models loosely inspired by human demography. Also following human demography, it focuses on the "life events" of organizations or firms, birth and death. Further, and more subtly, corporate demography is an attitude or point of view. Sometimes called a population perspective, demography abstracts from the individual firm and instead focuses on population characteristics, especially the number of firms in the population and the age distribution of firms. There is a strong tendency to be content with counting the firms, rather than using more detailed descriptions. Even the size of the firms is often ignored. Demography is strongly evolutionary, putting much stress on natural selection of firms, radically downplaying rational behavior. Corporate demography is actively hostile to economic notion of a representative firm or the loser, but related, idea of an ideal type.

Of course, a great deal of economics also deals with these issues of birth (entry), death (exit), and growth, size distributions (concentration). Most of this work would be considered industrial organization (industry economics in

Europe). Carroll and Hannan note the overlap, but vastly understate it. In this essay, I will first take up the overlaps with economics, then critically discuss the other issues raised by Carroll and Hannan.

## II. The Surprisingly Large Overlap of Interest

Carroll and Hannan note the overlap with economics briefly, pp. 37, 38. Sensibly, the survivor technique, pioneered by George Stigler (1958), gets the most attention. But, in a bizarre turn, they seem to believe that Stigler's approach has died out, saying that, "The technique is still described in many economics textbooks, although rarely (if ever) gets used in articles appearing in the major journals." (2000, p. 37) Perhaps this is true is one ignores the journals in the relevant field of industrial organization. But, a quick search of EconLit for papers with the word "survivor" in the title, showed 35 papers, of which 15 papers use the term in the sense of survivor analysis, since 1969. The list includes an article in the Journal of Law and Economics (Keeler 1989) (trucking), and two in the Journal of Business: (Frech and Ginsburg 1974) (physician services) and (Blair and Vogel 1978) (health insurance).

Further, this search is far too narrow. Survivor analysis has come to be so commonplace that it is not acknowledged. For example, the important and controversial

works of William Comanor and Thomas Wilson on the economics of advertising uses a version of survivorship to derive a key explanatory variable: scale economies (1967,1974). Their 1967 paper is one of the most cited papers in the history of economics. It spawned an entire industry devoted to research on the economics of advertising.

Further, there is an enormous amount of work on entry, exit and the size distribution of firms in economics. A quick EconLit search of articles with "entry" in the title, showed 1,591 entries, for "exit," 342, for "concentration" 1,212. Again, the search for the word in the title is far too narrow.

At a more detailed level, the explicitly evolutionary approach to economics is very closely related to corporate demography. Yet, it gets little attention. George Stigler and Richard Nelson and Sidney Winter (e.g. 1982) are cited, but amazingly, the seminal paper on this approach, by Armen Alchian (1950), is not. Economists have long been studying very similar issues to those of the corporate demographers on a large scale. But, there are major differences in approach.

### III. Differences in Approach

#### B. Corporate Demography is More Descriptive

Corporate demography is generally descriptive and unfocused. That is, there is no clear decision-theoretic purpose to the typical study. It's a little like studying antitrust in economics, without a specific case or situation in mind. Personally, I find it boring. But, when there is a specific issue, in a specific case, antitrust economics comes alive. In the situations where demography has a focus beyond description (e.g. the impact of innovations or regulation), it is, in my view, much better. Economic studies, at least in industrial organization, usually have a particular policy question, or point of intellectual debate, that focuses the research. Further, methodological issues that are uninteresting or unanswerable in the abstract (e.g. should we put our effort into more detail for a few years or more years of data) become important, interesting and answerable. While it's a matter of degree, corporate demography suffers from its attempt to be generally descriptive, rather than being focused on a particular research or policy question. Trying to be generally descriptive leads directly to a very high level of abstraction.

### C. Corporate Demography is (Surprise) More Abstract

One normally thinks of economics as being the most abstract of the social sciences. But, in this context, corporate demography is generally more abstract than

industrial organization economics. This comes from the attempt to find empirical regularities that hold across different technologies, industries and time periods and to avoid much research into individual firms, technical developments or regulation. The picture of the economy one gets from this work is from 50,000 feet.

Carroll and Hannan stress the diversity of organizations as a basis of the demographic approach. But, the demographic approach implies a view of organizations and the environment over time and space as being homogeneous.<sup>1</sup> For example, One of the most popular industries for demographic analysis has been the automobile industry. Many studies span the entire history of automobiles, from 1895 on. Indeed, Carroll and Hannan recommend these sweepingly long time periods. This implies heroic aggregation over these time periods and over the entire world. The Stanley company (which produced steam automobiles in the early 20th century), General Motors and Beck (which produces small numbers of high quality replicas of 1950s sports cars: Porsche Spyders and British Lister-Chevrolets) are all counted as automobile producers.

Interestingly, in economic survivor analyses, the researchers carefully pick time periods that are short enough that the basic technology doesn't change much. In practice, economists usually interpret that to mean perhaps 10 years, but not 100 years! Similar issues arise in estimating cost or production functions. Economists are



also careful to limit the definition of an industry to firms that compete closely in product space, e.g. in antitrust markets. The downside is that economic studies can be ahistorical. The definition of industry used in corporate demography is, by economic terms, extremely wide.

One of the major results of this high level of abstraction and aggregation leads to what the demographers call density-dependence of the birth and death of firms. The analysis of competition also stays at a very abstract level.

#### C. Corporate Demography Avoids Maximizing Behavior

Carroll and Hannan are sharply critical the usual maximization assumptions of economics (and of the rational choice school of sociology). For a general description of the numbers of firms, this may not be a big issue, especially if evolution and natural selection are very important. In such a world, exit might be considered sort of mechanical. But, this leaves very little structure to the theory of entry and corporate change or policy. It also leaves little of a prescriptive nature to say to managers--slightly odd for professors in major US business schools.

The depth of the animosity to maximizing models shown by Carroll and Hannan is hard to exaggerate. For example, they note evidence that people are more likely to start new firms if they loose their original jobs and also if it is

easier to acquire resources. They take this as evidence against rationality (2000, p. 14). At another point, in discussing organizational change, they downgrade rational choice approaches by saying that, "it will always be possible to identify opportunities in retrospect; but that does not mean decision makers of the time were aware of them or able to identify them," (2000, p. 360). I find this to be an amazing statement. Economists generally believe the exact opposite; that the decision-makers have far better information than outside observers. This explains why economists are so suspicious (too suspicious, in my view) of interview and survey data. In a similar vein, Carroll and Hannan argue generally against transactions costs and game theoretic models.

#### IV. Vital Events are Excellent Performance Measures

Often, economists and others want to evaluate the performance of a firm, or an industry. The ultimate (though often implicit) point of the exercise is to say something relevant to policy (e.g. antitrust policy). But, how should one measure performance? The most common answer in economics is with accounting measures of revenue, costs or profits. Increasingly since Stigler's survivor papers, economists have looked at entry, exit and growth. Entry and exit are the vital events focused on by demography. In any

case, economists' choices of performance measures are rarely discussed or defended.

In contrast, corporate demographers have worked out an argument for using the vital events as their focus. It's similar to the argument for using human mortality in gauging the output of health care systems (Frech and Miller 1999, pp. 28-30). Both human and organizational mortality are relatively objective and measured well, with little error (at least in the rich countries). Organizational mortality is tough for managers or owners to disguise or dress up, unlike accounting-based measures. Most of the accounting-based measures of firm performance suffer from the fact that managers and owners have financial incentives and the ability, to some extent, to falsely indicate good performance to outsiders. In particular, they can smooth earnings over time and they can focus on whatever accounting measures are being rewarded in the organization or in the markets. So, when performance measures start being used as a basis for rewards, they run down--lose their informational content.

This is a good criticism of accounting measures and it doesn't get enough attention in economics. Many economists know nothing about accounting, to often leading to uncritical uses of accounting data. But, the discussion is incomplete by leaving out measures from financial markets, especially stock values.

Financial market measures are particularly difficult to manipulate, since they pick up the forward-looking decisions of many unknown investors, who have strong incentives to be informed and to see through accounting tricks. Financial market measures has been put to excellent use in many problems, e.g. in measuring the competitive and efficiency effects of mergers (McGuckin, Warren-Boulton and Waldstein 1992) or in measuring the financial harm of product recalls (Jarrell and Peltzman 1985). When they work, financial market measures probably trump all others. Unfortunately, they often don't work. Because of the way that statistical noise accumulates over time, financial measures typically can only pick up the effects of changes in firm policy or the environment that are revealed to the market over a short period of time. A change that is only slowly revealed will simply be swamped by noise, so that one cannot get a reading. Thus, financial market data can typically be used only for event studies where the event can be fairly clearly be assigned to a short period of time, like the Department of Justice filing a brief against Microsoft. It can't be used for, say, the effects of technological evolution

The corporate demography approach has great value, but it also has some weaknesses. Corporate demography is highly oriented to simple counts of firms and lifetimes. It pays relatively little attention to such issues as growth or market share. There is clearly some information about the relative efficiency of an organizational form here.

Further, Carroll and Hannan, in particular, argue that the forces of natural selection of firms are relatively weak (2000, pp. 397-400). If so, the inference of good performance, or more broadly fitness, from survivorship is weakened.

Still, the argument for studying vital events as (at least) a supplement to accounting-based measurements is overwhelming. In particular, if accounting-based measurements indicate that a particular organizational form is inefficient, but it survives and grows in relative importance, one has to question the accounting-based measures. Similarly, if accounting-based studies are inconclusive, as they are, for example, in the case of hospital scale economies, one must turn to survivor/demographic type measures (Bays 1986, Frech and Mobley 1995).

#### V. Organizational Forms and Inertia

In all analyses of firms over time, the issue of the persistence arises. In what sense is it meaningful to say that a firm now is the same organization as the firm 10, 20 or 50 years ago? All of these related approaches of survivor analysis in economics or corporate demography assume that, in some sense, the firm remains the same over time. If, on the contrary, firms could easily change their nature, there wouldn't be much interest in studying these

issues. Demographers have developed nice theories of organizational inertia.

Carroll and Hannan generally take the view that founding and mortality are the key events; change is less important. The fundamental nature of the firm is set at the founding. This puts stress on natural selection, as opposed to purposeful managerial decisions, as the main engine of change at the industry level. They are explicitly critical of standard industrial organization studies of firm behavior as implicitly assuming that changing the firm (e.g. repositioning the output in product space) is costless (2000, pp. 358-359). They are also critical of studies of a few large, successful organizations. They argue that there is a large bias here; the life histories of these organizations are far from typical. But, note the opposite bias in the demographic tradition. The hundreds of failed breweries don't matter much for the economics of brewing, but Budweiser and Guinness do.

Carroll and Hannan argue that natural selection favors organizational inertia. They argue that firms do well if they are reliable and accountable. Reliability simply means consistency in performance, e.g. producing the same quality computer or beer every time. Accountability means the ability to construct rational accounts for the firm's behavior. Accountability strikes me as far less important. Neither General Motors nor Microsoft, have produced good rationales for their behavior, or even their existence.

But, they are very reliable organizations. Carroll and Hannan argue that reliability requires structures that are resistant to change. It follows from this that major changes will be expensive. They argue further that major changes may well increase the probability of failure, at least in the time immediately following the change. They present convincing empirical evidence that this is often the case. On the whole, the discussion is persuasive, but the ambiguity in the causes of corporate demographic events at this high level of abstraction creates a problem.

Firms innovate for two reasons, because of a perception of excellent opportunities, or out of desperation because they are failing. It would be valuable to separate these different market situations of the innovating firms, but that requires a detailed examination of the situation facing the firm, which is not in the spirit of corporate demography.

Another aspect of the inertia idea comes from the idea that organizations are imprinted at the time of their founding by the then-current environmental conditions and by their founders' ideas. This argument is attributed to Stinchcombe (1965, 1979). Evidence of this has been found in many types of industries, including new firms in Silicon Valley, which have been studied intensely in a large, multi-year project, called the Stanford Project on Emerging Companies. The data suggests that the founder's ideas or models influenced the structure (specifically, the

percentage of employees engaged in administration, a proxy of bureaucratization), but the current, non-founders' ideas did not. Notice the use of the environment here. To take the extreme case, if the environment is permanently imprinted on the organizations, outside analysts (economics and demographers) do not have to study it in detail. Indeed, corporate demographers research strategy involves inferring as much as possible from the simple vital event of the firms, with as little explicit investigation and modeling of the environment as possible. Economists would ordinarily believe that a crucial part of the environment, whether taking an adaptive view of firm decision-making or a more Alchian/Nelson/Winter evolutionary view, is competition.

On the whole, the idea of organizational inertia is compelling. The idea that inertia is so great as to justify the extreme aggregation over time used in this literature is not so quite so compelling.

## VI. Differing View of Competition and Markets

The treatment of competition in corporate demography follows from its high level of abstraction, both over time and across organizations. It is difficult to say much in detail about competition over a hundred years and hundreds of firms in a population. Here is an area where economics



can help demographers to take a more narrow focus which will enrich their studies.

In economics, of course, the study of competition focuses on cross-firm effects of prices in input and output markets. Competition is a very structured concept, working completely through markets.<sup>2</sup> In demography, in contrast, competition is viewed very generally as something more closely related to biological competition. According to Carroll and Hannan "Competition refers to some kind of negative effect of the presence of one or more actors on the life chances or growth rates of some focal actor," (2000, p. 225). Carroll and Hannan distinguish between two types of competition, structured or directed, also called head-to-head competition, and diffuse competition. as when the firms are dependent on the same resources. They miss the idea that both types of competition are structured and mediated (at least in private property systems) through ordinary economic relations in markets. They stress the diffuse competition because they think it is more clearly density-dependent. I will discuss density-dependence later.

#### A. The Industry in Economics

In economics, the concept of competition tightly disciplines the analysis. Economic analysis generally proceeds by industry, that is, sets of firms that are close enough competitors to each other to constrain each others'

choices of price and quality. This is a far narrower and sharper definition of competition than is used in either corporate demography or common language. The economic approach is reflected in antitrust and competition law (e.g. in the Federal Trade Commission/Department of Justice Horizontal Merger Guidelines, 1997.)

Usually, the cutting edge of competition, thus market definition, is on the output side. That is, most often the inputs are general and the firms compete with firms in many different industries for the inputs. For example, the machine tool industry and the appliance industry both use steel and energy, but firms in these industries, and indeed, these entire industries, represent a small part of the demand for steel and energy. Continuing the example, the boundaries for defining these industries would be drawn to include firms that compete directly enough to constrain price and quality decisions in output markets. To see how to define the markets, one would look to how substitutability on the demand and supply side. On the demand side, the question is: Are the goods close substitutes for consumers? On the supply side, the question is: Can other sellers quickly switch to supplying a good that consumers view as a close substitute?<sup>3</sup> The end result is a list of sellers, or perhaps geographical locations of sellers who restrain the each others' price and quality. One could ask, how much restraint is necessary to for a firm to be considered in the industry? What is the threshold?F

The FTC/DOJ Guidelines give a fairly crisp, if somewhat arbitrary, answer to this that has been widely accepted (at least in antitrust). If one starts with a list of sellers that might be considered an industry, the question is: Could a hypothetical cartel of these firms raise price by more than 5 percent for more than a year? If so, it will be considered a separate industry for antitrust purposes. Thus, firms must strongly discipline each other to be considered to be in the same industry. Further, there are two dimensions to the analysis: product space and geographic space. So, the firms must be close enough in both dimensions to be in the same industry.<sup>4</sup> Many industries have local or regional markets (e.g. hospitals), many do not (e.g. steel). These rather tight ideas of competition and market definition strongly influence the study population for economic analysis. The situation in corporate demography is altogether different.

#### B. The Industry in Corporate Demography

In corporate demography, the approach is far looser in two senses (Carroll and Hannan 2000, pp. 167-182). First, the choice of study population doesn't get much attention. Carroll and Hannan argue that study populations are delineated by selecting organizations of a particular organizational form that might plausibly compete (2000, pp. 63-66). Although Carroll and Hannan give far more attention

to the idea of form, I will take up the idea of plausible competition first.

Firms are plausibly competitive, according to Carroll and Hannan, if they are, "dependent on a common set of material and social resources," (2000, p. 65). This idea, of course, is not very closely related to the idea of a market and, in fact, is hardly constraining at all. One could say that all producers of machinery, from steam turbines to refrigerators use the same material and social resources.

In practice, though, the main actual definition seems to be simply an extremely expansive concept of an economic market--a concept that firms are in the same population if they use loosely similar inputs to produce a products that are put to loosely similar uses, or physical function. For example, in defending the inclusion of microbreweries and brewpubs in the same population as mass-production breweries, they argue that microbreweries and brewpubs produced "the same generic product...used the exact same ingredients...roughly the same production techniques...purchased by the consumer for the same purposes (2000, p. 68)." They go on to argue that the different types of firms are potentially competitive and that including the microbreweries and brewpubs in the analysis allows them to investigate their relationship with the mass producers. To get a further flavor of the populations used, examples include automobile manufacturers (defined extremely

broadly), banks, baseball teams, breweries, semiconductor manufacturers (2000, p. 64). The other reference for population delineation is organizational form.

Form, in the sense used by Carroll and Hannan, is a bit vague. The best definition I found is a "recognizable pattern that takes on rule-like standing," (2000, p. 67). The first part of the idea is, therefore, essentially circular. A form is whatever gets recognized as a form. In practice, recognition seems to mostly mean recognition by whoever collects and uses data in the commercial world. If data are collected on sets of firms, the implication is that they are somehow comparable. So, while logically circular, the practice of looking at sets of firms which are conventionally grouped makes good sense.

The patterns include features, the nature of which is left open-ended. But, examples of studies mentioned by Carroll and Hannan suggest that a broadly similar technology (breweries, semiconductors) or being organized under particular laws (credit unions, savings banks, savings and loans) are often determinative. Other aspects of form, such as private v. public corporations, sole proprietorships v. partnerships v. or even profit v. nonprofit legal status don't seem to often make a difference, even though they are certainly recognizable.

The second part of the form idea, the idea of the pattern taking on rule-like standing is fascinating. I would argue that it's ultimately useless (and actually not

really used) for defining research populations, but it is independently interesting. Carroll and Hannan state that the form has "imperative standing," which seems to mean, in some socially approved sense. That is, society, both outsiders and insiders, have some view of how the organization should be set up. In Carroll and Hannan's view, the organization is, therefore, punished in some way if it deviates from these socially-approved forms.

The language suggests that they don't mean governmentally or legally approved, and the authors consistently downplay the role of legal and regulatory constraints in their high-level theoretical and methodological discussions. Yet, their most convincing and interesting example of how forms can change is just that: new laws allowing breweries to own pubs allowed the development of brewpubs (2000, pp. 79-80).

This rule-like standing idea is striking. Consider some space of possible features of an organization. The idea is that relevant outsiders have tastes defined over this space, so that they like firms to be in certain restricted regions of the space and they punish firms for deviating. Presumably the relevant outsiders are primarily suppliers of inputs, such as capital and labor, and the demanders of outputs. Because the views of the outsiders exist only in unwritten social codes, the forms can change over time. This provides an argument against imposing a

fixed population delineation over long time periods. But, of course, this is exactly what corporate demography does.

In practice, this methodological and theoretical apparatus is problematic. There really is no method to determine which organizational features are important, nor even what a pattern is. The socially-approved form idea seems to contain little or nothing that isn't picked up by such mundane matters as factor prices or marginal costs, output prices, or demand and legal regulation. After all, if a firm's activity is legal and profitable and it can buy inputs and sell outputs, what does it matter whether the form is socially-approved? No one else needs to approve, other than the suppliers of inputs and the demanders of outputs. And this approval by the relevant outsiders is far better summarized by ordinary economic measures, such as prices, than by social legitimacy.

But, this raises a new problem. If the theory for defining an industry is useless, yet we observe very interesting and informative studies being performed by demographers, what are they doing? I suggest that they are simply following convention. Mostly driven by issues of data convenience and an appreciation of the field's external audience, the populations studied are simply sets of firms that others in the commercial world have treated as sets. In particular, if the gatherers and users of data have treated a set of firms together, there is a presumption that there is a market for further studies of this set, including

corporate demographic studies. So, conventional recognition (e.g. in directories, catalogues, encyclopedias, registries) appears to be crucial, for two reasons. First, simple convenience. And second, demonstration that there is a market for treating these firms as a set.

Further, I would say that economists are not immune from these conventional commercial influences. In the absence of a theoretical rationale, economists sometimes study extremely broad "industries," precisely because there is data and demonstrated interest in a particular set of firms. Witness the many studies of the semiconductor or pharmaceutical manufacturers, sets that are far broader than can be justified by the definition of an economic market. At the extreme is a recent paper by Kenneth Troske's on entry and exit in manufacturing and in a set of financial services industries (finance, insurance and real estate) (1996). And we economists, like the demographers, find a market for these studies.

### C. Density-Dependence and Competition in Demography

Competition mostly enters the realm of corporate demography through the concept of density-dependence. That is, the rate of vital events (mostly founding and mortality) has generally been shown empirically to depend on the number of firms in existence. This finding has been replicated for many populations and time periods. Demographers interpret



this as the interplay of legitimation and competition. An organizational form is considered to be legitimate when it becomes "socially taken for granted," (2000, p. 223).

As densities rise from very low levels, the mere repetition of the type of firm gives it legitimacy, simply because it's more common. This makes it easier to form similar new firms. Eventually, legitimacy levels off, so that the only effect of additional density is more competition for resources (in a very general sense, including competition for customers). Here, the resources are viewed as being more-or-less fixed, hence the key issue is density relative to "carrying capacity." This analysis is very abstract, pretty much the same as one would use for analyzing the spread of a new variety of plants or animals in the wild. It fundamentally ignores such economic ideas as the demand for the product, the development of substitutes or complements, technological change or the sizes of the firms.

#### 1. Number of Competitors

Competition is viewed as primarily diffuse in the sense described above. Carroll and Hannan view the diffuse competition as depending on the number of possible competitive interactions among firms in a population. The intensity of competition, (hence lower founding rates and higher mortality rates), rises with the square of the number

of firms. Carroll and Hannan claim that it becomes very difficult to manage a firm with many competitors because it's hard to design a policy to deal with all the competitors. But, this betrays some confusion that the economists' ideas on competition can dispel. Consider a firm in a small numbers oligopoly situation. It must consider how it's rivals will respond (the oligopoly problem in economics). As the number of competitors rises, it actually becomes easier to make decisions. At the limit, with many competitors, a manager can completely ignore them. All that matters is input and output prices. The best possible strategy is a simple one of maximizing profits, taking the prices as given. This is the model of perfect competition. Between the extremes, it becomes possible to ignore the idiosyncrasies of the competitors and simply maximize profits, subject to relatively simply supply and demand conditions. This is monopolistic competition.

## 2. The Concept of "Carrying Capacity"

The idea of carrying capacity is a very poor metaphor for firms in an economy. It suggests a finite supply, with costs rising sharply with demand. But, this is the wrong image. Firms buy inputs, mostly from other industries. The long run supply of inputs available to that industry may easily be perfectly elastic at a given price. Or, price might even decline with higher volume. Higher output in the

supplying industry may encourage learning-by-doing and technological research and development. Consider the price of most natural resources, or of integrated circuits. They have gone down enormously as the firms using them have expanded. In the very short run (maybe one year), the idea of carrying capacity might mimic the actual economic structure of capacity (or, in agriculture, of a season's crop), but corporate demography is oriented to the long run.

Even in the short run, where carrying capacity might be a useful idea, what matters is not the number of sellers or buyers, still less the number of possible competitive interactions. It is demand conditions relative to supply or cost conditions. An economist wouldn't call this an issue of competition at all. It is a matter of scarcity, not competition. You may find no profitable way to continue production because of the supply and demand conditions whether you are a perfect competitor or a perfect monopolist. This means that the total number of firms (density) is largely irrelevant. What matters are the demand conditions in output markets and the supply conditions in input markets. A firm's interactions with rivals depend on the total size of the rivals' supply and demand relative to the size of the markets. Often, in input markets, even large industries are not large buyers in this relevant sense.

## VI. Conclusion

Corporate demography and economics overlap much more than is commonly supposed. Further, they have much to contribute to each other. In this essay, I've stressed what economics can contribute to demography more than the reverse because I understand economics better, not because I think the contributions should be one-sided. In particular, the demographers' focus on vital events as performance measures and on long sweeps of time are a good influence on economists who are sometimes ignorant and uncritical users of accounting data and often too ahistorical. In the past, the two fields have interacted very little. Carroll and Hannan have done a great service to economists by opening up communication with their excellent book. I strongly recommend economists, particularly specialists in industrial organization to take note of the growing field of corporate demography. There is no better starting place than The Demography of Corporations and Industries.

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<sup>1</sup> See Jovanovic (2001), p. 107 for a discussion of the homogeneity issue.

<sup>2</sup> Competition through politics, or violence, or sexual competition is a different matter and is much closer to the sort of competition featured by the demographers. Economists study this, of course, but not much in the field of industrial organization. In industrial organization, there is a presumption of private property rights, so that one cannot compete through violence, but must, instead, compete by offers to buy or sell. See Olson (2000).

<sup>3</sup> In the Federal Trade Commission/Department of Justice Guidelines (1997), supply side substitutability is handled as an issue of ease of entry, rather than industry definition. The Guidelines treatment is sometimes awkward, so I will not follow it here. E.g. consider the machine tool industry where goods are not close consumer substitutes, such as lathes and milling machines. Nonetheless, machine tools are typically treated as one industry, not a collection of industries with easy entry.

<sup>4</sup> For a discussion of some recent controversies in antitrust market definition, see Kenneth Danger and H.E. Frech III (2001).