

**CBA · NAU**

College of Business  
Administration  
Northern Arizona  
University  
Box 15066  
Flagstaff AZ 86011

**Impacts of Supply  
Chain Management on  
Competition**

**Working Paper Series 02-10— Apr. 2002**

**William Hildred, Professor Emeritus of Economics**

**James Pinto, Professor of Economics and Statistics**

College of Business Administration

Northern Arizona University

Box 15066

Flagstaff, AZ 86011-5066

**CBA · NAU**

College of Business  
Administration  
Northern Arizona  
University  
Box 15066  
Flagstaff AZ 86011

# Impacts of Supply Chain Management on Competition

William Hildred and James Pinto

The American food supply system provides a clear illustration of recent institutional evolution and some likely future outcomes of “supply chain management” (SCM), a required component of the curriculum in many business schools. In the extreme, recommended SCM practices seek to maximize profits for the entire chain of firms involved in bringing a product to consumers, even if the profits of individual firms within the group are reduced. This requires obliteration of many traditional competitive relationships among businesses. Much of the thrust of SCM is accomplished through contractual arrangements that leave intact the independent status of the firms involved. However, several models exist in which firms bend others to their wills and lessen competition through various SCM practices. The antitrust bar has taken note of these situations, but textbooks on SCM and Principles of Economics ignore the issue, to the detriment of understanding.

## COGNITIVE DISSONANCE WITHIN THE BUSINESS COLLEGE FACULTY

Many academic economists who have earned our degrees outside the business college environment experience some cognitive dissonance in our work if we teach in a college of business, and we may perceive that several components of the curriculum for the business degree are faulty, incomplete, and incompatible. Our colleagues in the business school environment overwhelmingly understand their professional purpose to be the preparation of graduates who are attractive employees for business organizations. To these organizations, the attractive job candidate will have internalized the ethics and motives associated with the goals of profit maximization or “shareholder value,” and acquired specific skills useful thereto. This candidate should be at least dimly aware of broader social and economic purposes and concerns, including the importance of antitrust law, but prospects for success in the corporation may not be lessened if social constraints on acquisitive behavior are viewed as irritants to be evaded or eliminated.

An opportunity exists early in the business curriculum for students to become conscious of a broader perspective, since the micro- and macroeconomics principles courses are required, if only to satisfy the interests of accrediting agencies. This means that, for the micro course, even the diligent economics professor, perhaps of Institutionalist bent, may be constrained by a master syllabus that specifies that the geometric superiority of competitive private enterprise be explained. Departures from competition should be shown to reduce consumer well-being and antitrust laws presented as necessities for preserving the competitive ideal. A few additional roles for government may be allowed, as externalities or public goods are considered. Societal concerns that are not readily monetized are easily subordinated into nonexistence.

Whether or not the introductory-level exposure creates an appreciation of non-pecuniary values, the upper-division vocationally oriented business courses seek to mold the ideal corporate job applicant, emphasizing attitudes, strategies, and tactics for besting competitors.

The microeconomics course has conveniently made available the myth of the “invisible hand,” to be invoked to assure the novices that, while some individuals and firms falter and fail, the competitive structure of the system provides opportunity for their eventual location in a situation for which their aptitudes and skills are more suitable. Should they not achieve this success, the fault is their own, and “everyone” will be better off if the wholly temporary travail of these few is not relieved. Social and political concerns should not interfere with the efficient conduct of business.

To solidify the efficacy of this perspective, it is further encapsulated in the “obvious” requirements of the global business system. Those who would urge a softer attitude are cautioned that the regime of free markets that extends throughout the planet will see to their demise should they ignore the requirements of that system.

No less a result than the preparation of business graduates for performance within the business environment is the formation of their understanding of the nature and extent of public problems, especially if that understanding negates the reality or importance of the public problems. Specifically at the present time, as concerns increase in some quarters about the demise of competitive structures, it is important to note that present trends are not inevitable, but to the extent that they are misunderstood or ignored, opportunities for remedy become difficult to pursue. In this connection, both the microeconomics course and SCM instruction are deficient.

### THE ECONOMICS LESSONS ON INDUSTRIAL STRUCTURE AND ANTITRUST POLICY

Since the standard microeconomics course is the business graduate's first, and usually last, experience with the concepts of industry structure, the introductory texts in use in American universities provide the bulk of knowledge of economic issues that most students carry into their professional careers and civic life. While there may be some variations, several decades of teaching experience support the conclusion that textbook examples offered to illustrate the applicability of microeconomic theory are often oversimplifications, and sometimes serious falsifications. As a case in point, in one of the most popular texts of all time, McConnell and Brue (M&B) state in their 14<sup>th</sup> edition that agriculture is a good example of perfect competition [188]. The major criterion (along with the fiction of easy entry) is the nature of the product: ". . . a very large number of firms producing a standardized product (one identical to that of other producers such as corn or cucumbers)" [187]. The relevance of the perfectly competitive model is the "fact" that "few industries more closely approximate pure competition than any other market structure. In particular, much can be learned about markets for agricultural products (wheat, rice) . . . by understanding the perfectly competitive model" [189]. In their chapter on agriculture, they state "Agriculture is an industry which, in the absence of government farm programs, is an example of [the] pure-competition model. The industry consists of many firms selling virtually standardized products and can be understood by applying the demand and supply tools of competitive markets" [404]. They do note "While farmers face purely competitive markets for their outputs, they buy inputs of fertilizer, farm machinery, and gasoline from industries which have considerable market power. While these industries have an ability to control their prices, farmers are at the 'mercy of the market' in selling their output" [410].

Finally, M&B indicate that *government policy* (in the form of subsidies) is a major contributor to the severity of farm problems, because it is not based on a correct appreciation of short- and long-run elasticities. For the sake of presenting simple demand and supply diagrams, farming is simply "farming." No reference is made to the immense differences among vegetable growing near urban areas, dairying with its unique price support system, grain and cotton growing with their quite different price support systems, beef cow-calf operations, beef feedlots, factory cultivation of poultry and pork, and all other nuances. Gross simplifications may be necessary for the encyclopedic introductory textbook, but they should not be allowed to comprise the entire framing of issues for each generation of newly informed citizens.

As well, M&B present the market structure of monopolistic competition as benign: although product differentiation confers some control over product price, no other element of significant market power exists. The traits of smallness and freedom of entry ensure a permanent absence of market power. Their example of a monopolistically competitive environment is "retail trade" [188]. As will be shown below, this is clearly false because it encompasses such a large variety of outlets, and some of them – the manufacture and sale of food in particular – are highly concentrated.

Finally, acceptance of monopolistic competition as a beneficial structure is a mainstay of ability to believe that an invisible hand is at work to maximize the welfare of consumers. That hand's handiwork adequately eliminates the need for public concern about and intervention in the operation of this market. Intervention is justified only if there are a mere few companies seeking the favor of consumers, and any of them, or all of them collectively, can exert control over prices and other elements of the transactions with consumers. Such control is achieved only through horizontal combinations; vertical arrangements do not diminish competitive outcomes, hence do not harm consumers.

This fixation on horizontal combinations obscures the nature of competitive relationships in the vertical dimension, and thereby, the dangers of its decrease. This ignorance is apparently shared by the antitrust establishment, in which only a few writers have examined and commented on vertical issues, and enforcement is yet to appear. We turn now to an examination of some effects of vertical integration in the food system in the United States, beginning with the agricultural context provided by Hayden.

## SOCIAL INEFFICIENCY IN AMERICAN AGRICULTURE

Nearly two decades ago, F. G. Hayden addressed policy failings affecting American agriculture. He argued that the system, regarded as highly efficient when judged by pecuniary output measures, has much wider substantive impacts, not least that it;

destroys cities by overloading them with displaced persons; destroys rural communities and their social services because there are not enough people to support them; destroys topsoil and water supplies; poisons ground and surface water supplies with chemicals, pesticides, and fertilizers; augments desertification; destroys soil humus and porosity, which means less water retention, which means that compacted soil needs larger tractors which further compact soil; leaches nutrients from and adds salts to the soil through irrigation; uses more energy than it produces; causes worker sterility in the fertilizer factories; creates health problems for farmers who apply the fertilizer, pesticides, and herbicides; uses fertilizers which prevent plants from absorbing nutrients necessary for human health; fills the food chain with carcinogenic pesticides, herbicide growth hormones, and antibiotics; creates an expensive and unnecessary transportation system; diverts millions of acres each year in Third World countries to nonfood production; processes the nutrients out of what food is produced with the profits being greater, the greater the amount of processing; and fills the processed product with carcinogenic preservatives, refined sugars, salt, and artificial colors [Hayden 1984, 182].<sup>1</sup>

Little improvement has occurred regarding most, if not all, of the characteristics of his farm scape: farm consolidation proceeds (now at the point that some foresee only 30,000 remaining on the land [Hefernan 1999, p. 13]), industrialization of the food chain accelerates, and rural decay is the rule. Forces that Hayden did not examine are raising the trajectory of these trends, and have induced drastic changes in the food chain downstream from the rural environment. These changes are strikingly exemplified by horizontal concentration at the various stages of food provisioning. Moreover, the effects of horizontal concentration are exacerbated by vertical linkages, supremely important elements of SCM.

### DIMENSIONS OF CONCENTRATION IN THE FOOD CHAIN

#### Retail Firms

Analyses of conditions at the retail level of food provision are supported by little authoritative data. It does seem that, nationally, the four largest chains control 43 percent of sales, and the top six over 50 percent [Cotterill 2000, pp. 5,]. These firms are Kroger, Wal-Mart, Albertson's, Safeway, Royal Ahold, and Del Haize. In another telling, controlled a third of sales in 1999 [Cotterill 1999]. Foer claims that Kroger, Albertson's, Royal Ahold Wal-Mart and Safeway may control 46 percent of the market [Foer, Food Retailing, p. 2].

From the consumer's perspective, the local market is where shopping occurs, and the behavior of sellers in that market is of primary concern. Nearly complete dominance by a few large firms is pronounced in many small areas. For example, the four-firm concentration ratio is 90 percent in Buffalo-Niagara Falls, 73 percent in Hartford CN, 66 percent in the Boston-Worcester-Lawrence market, and 65 percent in Cleveland-Akron [Foer, note 9, p. 7]. The exercise of that power, however, may be tempered by fear of a yet greater power. For example, one of the largest firms in the East is Stop & Shop (a major component of Royal Ahold), which holds over 16 percent of the \$24 billion New England grocery market. With the two next larger firms, it controlled 38 percent of the market in 1995 [Griffin Report of Food Marketing, 1995]. Yet these firms and others in New England were apparently quite fearful of losing customers to Wal-Mart, which began moving into previously bypassed urban centers. Its plans to build new stores in New England, including urban Massachusetts, occasioned a flurry of defensive strategies by Stop & Shop and others [Reidy 2002, p. C10].

In every such instance, however, oligopoly power remains at work in these areas. Pricing policies may redound occasionally to the benefit of consumers, but one should not expect oligopoly profits to be willingly eschewed.

Of course, with mergers and acquisitions a necessity for survival and enlargement of these giants, remaining smaller sellers are always in a precarious environment, should a giant or two decide to take over their market shares.

#### Food Manufacturing or Processing

Preceding retailing in the food supply chain is the similarly concentrated realm of food manufacturing. Here, more than in retailing, the global dimension is important. Table 1 shows the 1990 food sales data for the six

largest food manufacturing firms. (Significant changes have occurred since 1990; by 1999 mergers and acquisitions had moved ConAgra from eleventh to third largest in the world behind Nestle and Phillip Morris.)

The degree of concentration at this level of the supply chain duplicates that of the retail level: the four largest firms hold 42 percent of the market, and the top six command more than half. Whereas oligopoly power at the retail level assuredly provides pricing discretion that directly affects the final consumer, the importance of oligopoly power at the manufacturing level is not so clear. These oligopolists confront oligopsony power by the retailers, fostering the exaction of favorable input prices from manufacturers and adding to the retailer's ability to obtain non-competitive prices and profits.

**Table 1: Largest Food Manufacturing Corporations**

Corporation	Sales	Cumulative Sales	Cumulative Percent
Philip Morris	30432	30432	14.8
Nestle SA	28104	58536	28.6
Unilever NV	18128	76664	37.4
IBP	10185	86849	42.4
Pepsico	9992	96841	47.2
Grand Metropolitan	9528	106369	51.9

Source: Welch 1996, p. 5.

As with retailers, thousands of small manufacturers must contend with the hegemonic intentions of the major firms in their industries, (see endnote 5 for an example.)

#### **Vertically Integrated Food Manufacturers**

While some manufacturers may feel pressure from giant retailers, their own ranks include gargantuan companies that exert great leverage themselves. This leverage may work further backward, to the disadvantage of their own suppliers (to whom they appear as oligopsonists) or forward to the retail level (to whom they appear as oligopolists).

Some are especially well endowed with power because like Tyson (sole-source supplier to Wal-Mart, at least in some localities), they own their product at several or all stages of production – in the case of Tyson from baby chick to brand-name packages in the meat counter. ConAgra feeds beef and pork animals to the finished stage, slaughters the animals and packages the meat for the grocery counter.

Moreover, in beef production where numerous independent feeders still exist, the high level of processing firm concentration is employed to the smaller feeders' disadvantage. As with ConAgra's feeding its animals, so too others own "captive supplies" of feeder stock which frees them from necessity to purchase slaughter animals on the open market and manipulate outcomes in market interactions in which they do join.<sup>2</sup>

Some recent data at this level of production are presented in Table 2.

**Table 2: Concentration Ratios In Vertically Integrated Food Manufacturing**

<u>Beef (79%)</u>	<u>Pork (57%)</u>	<u>Broilers (49%)</u>	<u>Turkeys (42%)</u>
IBP Inc.	Smithfield	Tyson	Jennie-O
ConAgra	IBP Inc.	Gold Kist	Butterball (ConAgra)
Excel (Cargill)	Swift (ConAgra)	Perdue	Wampler
Farmland Nat'l.	Excel (Cargill)	Pilgrim's Pride	Cargill

Source: Heffernan 1999, pp. 17-18.

### **Concentration from Farm Inputs to the Supermarket: Emerging “Clusters”**

Heffernan carries this analysis further, discerning a set of emerging “clusters” that include several of these processors and congeries of allied firms—including global partners -- that currently or prospectively exert control over a food commodity from germ plasm (another level at which a very few firms are present at all) to supermarket. Although Heffernan confesses that data to underpin the analysis are nearly impossible to obtain (some of the giant firms are privately held and release no information about their operations), he gives as examples Cargill, Monsanto, and Novartis, all of which are highly significant sellers of seeds, fertilizers, and/or other chemical inputs. They are also dominant in developing and patenting gene-based innovations in seeds. They are involved in relationships with each other and other firms in chains reaching from these seeds all the way to the grocery store. For example, Monsanto provides its patented seeds and Cargill sells the fertilizer to farmers under contract; Cargill buys the grain and processes it for various uses including production under its name of beef, pork, turkeys and broilers, which it also processes under its name for sale to supermarkets. ConAgra buys seed from DuPont, sells it under contract to farmers, collects the grain and processes it, some to feed its animals (beef, pork, turkeys, broilers, seafood), which it processes into shelf-ready food. A similar chain is operated by Novartis, Archer Daniels Midland, and IBP.

His research is pathbreaking. If he is correct, these clusters have the capacity to eliminate the operations of markets and the visibility of prices as indicators of the value of activities.

We have chosen to organize the information around the emerging clusters of firms that control the food system from gene to supermarket shelf. The term “alliance” is frequently used to suggest the “seamless system” which describes the emerging, fully vertically integrated food system from gene to shelf. Within this emerging system, there will be no markets and thus no “price discovery” from the gene, fertilizer processing and chemical production to the supermarket shelf. The only time the public will ever know the “price” of animal protein is when it arrives in the meat case. As this system evolves, even the price of the livestock feed and its ingredients, such as the corn, will not be known to the public, because like today’s broilers the product will not be sold. The firm owns the chick and sends it to their processing facility from which it emerges, perhaps in a TV dinner. However, the prices along the line of production are never discovered until the chicken is sold to the consumer. In a food chain cluster, the food product is passed along from stage to stage, but ownership never changes and neither does the location of the decision-making. Starting with the intellectual property rights that governments give to the biotechnology firms, the food product always remains the property of a firm or cluster of firms. The farmer becomes a grower, providing the labor and often some of the capital, but never owning the product as it moves through the food system and never making the major management decisions [Heffernan 1999, p. 3].

### **Concentration at the Farm Level**

Although America is home to two million farms, more than 90 percent are categorized as “small,” selling less than \$250,000 per year. At the other extreme, the largest two percent of farms account for half the gross sales [Henson, 2000]. Clearly, even though the largest farms dominate sales, the significance of concentration at this level does not begin to approach that of the other stages: in the aggregate, the 400,000 farms that share half the sales of the industry are difficult to view as oligopolists, indeed, to have any market power. However, even where independent farming is visible, there are signs of emerging dominance:

Twenty feedlots feed about half of the cattle in the U.S. and these are either owned by the slaughtering firms or have contracts with the slaughtering firms. Operators of “independent lots” tell us that they seldom see buyers from more than one firm. Dairy farms are being consolidated, leaving only the cow/calf sector out of the integrated system [Heffernan 1999, p. 12].

Far from a consumer-friendly competitive structure, the system for delivering food has nodes of significant market power at every stage. This is a far cry from the impression given in the standard economics text of M&B. Their characterization of “agriculture” as nearly perfectly competitive is clearly false, and their assertion that retail trade is a meaningful example of monopolistic competition is contradicted by the concentration data. In brief, they fail completely in presenting reality, and students raised on their work are not prepared for intelligent citizenship.

We turn now to a review of SCM, to demonstrate that the vertically-directed strategies and tactics of SCM have important and largely ignored anticompetitive effects that intensify those resulting from the horizontal concentrations noted above.

## ANTICOMPETITIVE IMPLICATIONS OF SCM

### Brief History of SCM

Most of the literature of SCM emerged from the management, logistics, purchasing and marketing disciplines in the mid- to late 1990s [Larson and Rogers, 1998, pp. 1-5]. New and major journals, including *Journal of Retailing*, *Journal of Marketing Theory and Practice*, *Supply Chain Management Review*, *International Journal of Logistics Management*, and *Supply Chain Management: An International Journal*, have devoted much space to the topic. One of the earliest precursors to the idea of SCM can be found in Michael E. Porter's 1985 text, *Competitive Advantage*, in which he devoted an entire chapter to "The Value Chain and Competitive Advantage [Porter, 1985, pp. 33-61].

There are many definitions of SCM. The Supply Chain Council uses Kranz's 1996 definition as the "effort involved in producing and delivering a final product from the supplier's supplier to the customer's customer" [Kranz 1996, p. 4]. This is a very concise definition, but it needs some elaboration. The Supply Chain Council is a not-for-profit trade association founded to create a standard to improve supply chain processes among manufacturers, suppliers, distributors, and retailers. The Supply-Chain Operations Reference (SCOR) model is a cross-industry supply chain reference model containing standard process definitions, standard terminology, standard metrics, supply chain best practices, and enabling information technology [<http://www.supply-chain.org>]. Metz has used MIT's definition of integrated supply chain management (ISCM) as a process-oriented, integrated approach to procuring, producing and delivering products and services to consumers. ISCM has a broad scope that includes sub-suppliers, suppliers, interval operations, trade customers, retail customers, and end users. It covers the management of material, information and funds flows [Metz, 1998, p. ]. Some of the recent production operations management textbooks have included chapters on SCM. The 1999 fifth edition of Helzer and Render's *Operations Management* has such a chapter [Helzer and Render 1999, pp. 413-436]. The major topics covered include purchased inputs, SCM strategies, vendor selection, benchmarking, and management of materials and the supply chain. The authors do not give emphasis to consumers. Writers in logistics have placed more emphasis on consumers. Cooper, Lambert and Pagh have used a definition developed by the International Center for Competitive Excellence presented at the Ohio State University's Global SCM Forum which states that SCM "... is the integration of business processes from end used through original suppliers that provides production, services and information that add value for customers [Cooper, Lambert, and Pagh, pp. 1-14]. That is, logistics is concerned with the minimization of total cost while serving customers. As stated above, SCM is concerned with processes that add value for customers, but Porter holds that the value chain and value added are not compatible [Porter 1985, p. 39]. To emphasize this difference, Larson and Rogers have given the definition of SCM as "... the coordination of activities, within and between vertically integrated firms, for the purpose of serving end customers at a profit [Larson and Rogers, p. 2).

The legal, antitrust, and anti-competitive aspects of SCM have not received emphasis in this literature. A major exception is found with the deregulation of transportation, which may have SCM implications [Kellerman 1998, pp. 92-103; Hover 1985, pp. 55-61; Murphy and Hall, pp. 30-38].

### SCM in the Textbooks

SCM is now an accepted academic sub-discipline, and presumably an important opportunity for consulting contracts. Such contracts appear also to support the publication of academic journal articles that embody the learning that occurs when business professors are given access to firms' inner workings, and eventually are condensed into textbooks for training undergraduates. Unlike the physical sciences, the compilations of business cases seldom develop "laws," but result in usable generalizations based on empirical examples.<sup>3</sup> Nevertheless, such textbooks surely represent the best efforts of business professors who offer their students the current wisdom in their fields. Accordingly, we summarize some of the essential content of a new textbook on SCM, to display the nature of knowledge that qualifies students for a baccalaureate degree in business.

Before presenting essential elements of the text by Chopra and Meindl (C&M), it must be noted that concern with antitrust law and anticompetitive practices is completely absent from their book. Students who might dimly perceive some connections between the dicta of SCM and issues of competitive market structures must satisfy any curiosity in the matter elsewhere.

C&M designate a supply chain as "all stages involved, directly or indirectly, in fulfilling a customer request" thus encompassing "manufacturers and suppliers . . . transporters, warehouses, retailers, and customers themselves." As well, each organization in the chain, operating with distinct functions ("new

product development, marketing, operations, distribution, finance, and customer service”) must regard each function as an unit to be managed toward achieving supply chain goals [3].

In a quaint formulation, they define the goal of a supply chain as maximizing . . . the overall value generated. The **value** a supply chain generates is the difference between what the final product is worth to the customer and the effort the supply chain expends in filling the customer’s request. For most commercial supply chains, value will be strongly correlated with *supply chain profitability*, the difference between the revenue generated from the customer and the overall cost across the supply chain” [Chopra and Meindl, 2001, p. 5, emphases in original].<sup>4</sup>

In addition, C&M assert that the profit concept of interest is that of the entire group of organizations linked together in the supply chain. The constant theme of the text is that outcomes are not optimum unless this profit magnitude is maximized. Situations in which individual firms in the chain maximize their individual profits may simultaneously result in lower profits for the entire chain. In contrast, if entire-chain profits were maximized, the profits for every individual firm would be greater.

This is an extreme assertion, offered without supporting evidence. So that there is no confusion about its importance to the authors, we quote directly from their introductory comments in their section on information technology in the supply chain:

By taking a global scope across the entire supply chain, a manager is able to craft strategies that take into account all factors that affect the supply chain rather than just those factors affecting a particular stage or function within the supply chain. Taking the entire supply chain into account maximizes the profit of the total supply chain, which then leads to higher profits for each individual company within the supply chain [336].

From the outset, their central concern is the matching of demand and supply. Generally, demand is considered as given, though some notice is taken of tactics to increase consumer purchases (even though they are likewise denigrated as frequently merely shifting purchases from the future to the present, with undesirable results). The retail level has cognizance of consumer purchases, and other participants in the supply chain respond in their operations to information originating at the retail level. All stages must deal with inventories of supplies or completed goods, and this is the critical element: for every stage in the chain there is an optimum inventory level associated with maximum profits. (That level is identified by each firm in a tradeoff between responsiveness and inventory cost – the “single idea to which all characteristics of the supply chain contribute” [32].)

In their penultimate chapter, “Coordination in a Supply Chain,” C&M plead for total supply chain coordination, again on the grounds that lack of coordination lessens the total supply chain’s and individual firms’ profits. Though “many firms,” are alleged to have observed it, they cite the experience of three to identify a phenomenon dubbed the bullwhip effect. This becomes the overriding reason for total coordination.

The bullwhip effect is a progressive intensification of fluctuations in orders throughout a supply chain. Small fluctuations in consumer demand are increased as retailers misread temporary variations for longer-term trends and make large changes in their orders from wholesalers, who in turn amplify their orders to manufacturers. The latter continue the process in their orders to suppliers. Costs are higher at each stage than they would be in a situation of stable (or, presumably, regularly growing) demand for output for the next stage. Thus, manufacturers may hold excess capacity or produce excessive inventory. If surges in order overwhelm capacity and inventory, production scheduling is affected adversely, resulting in higher costs and increases in lead-time. To accommodate unforeseen increases, transportation capacity is greater than necessary, and higher costs result. Labor outlays associated with shipping and receiving at each stage are higher, whether for hiring excess workers or hiring additional temporary workers to meet demand increases. Eventually, on-time performance may be harmed and even retailers will lose sales because the product is temporarily unavailable, contributing to lower profits for all [pp. 360-363].

This pattern of variability can be mitigated by identifying its causes and applying specific remedies for each of them. Five categories are laid out: incentives structures, information defects, operational failures, pricing difficulties, and behavioral obstacles.

To improve incentives, managers should design the reward structures among the functions within each firm and at each stage to contribute to maximum chain profits. This probably requires overturning historical arrangements, for example, rewarding sales staff by periodic performance measures that do not intensify sales efforts at particular times, and gearing compensation to product sold at retail rather than orders taken [pp. 368-369].

Information problems can be ameliorated through sharing of point-of-sale data and collaborative forecasting and planning throughout the chain (perhaps by expanding the application of enterprise resource planning, or ERP), and by instituting control of replenishment at a single stage (continuous replenishment program --CRP, and vendor-managed inventories -- VMI) [pp. 369-370].

In operations, replenishment lead-time should be cut at the manufacturing stage through electronic data interchange (EDI), flexible or cellular production facilities and ASN. Lot size reduction should be encouraged, by implementing computer assisted ordering (CAO) and business-to-business (B2B) internet ordering [p. 371].

Transportation innovations include measures to ensure full truckload shipments and other shipping modifications, and reducing receiving department costs with advanced shipment notice (ASN) [372]. Finally, temporally based fluctuations (such as batch ordering) could be eliminated by assigning ordering times to customers, to distribute their replenishments evenly across days of the week and month. Since some retailers fearing shortages may inflate their orders, the experience of past order volumes should guide allowable replenishment shipments [p. 373].

Pricing strategies may need modification, notably regarding discounts. Volume-based discounts over a moving time frame should displace lot-size discounts; the latter encourage retailers to inflate orders, the former does not and results in smaller lot sizes and less supply chain variability. Retail promotions are also implicated in this variability as retailers increase orders to satisfy the promotion; usually, promotions do not increase demand but only shift it from the future to the present, so the larger orders increase variability. Everyday low pricing (EDLP) in the manner of Wal-Mart is the solution [p. 373].

Finally, in order to facilitate trustworthy information sharing and other cooperative relationships to enhance coordination, participants must work to build trust and equity into all relationships. The final portions of the chapter [pp. 374-383] elaborate a variety of hortatory advice to that end, all of which is doubtlessly pertinent but quite difficult to achieve.

As presented by C&M, supply chain coordination need not diminish the range or degree of competition, and they do not discuss the issue. However, the emphasis on coordination lends itself to eliminating the untidiness of uncontrolled, shall we say, "free market" transactions. Contracts and other collaborative arrangements to avoid them are preferred.

In addition, they suggest only a few times the possibility of passing through to consumers some of the efficiency gains of consolidation; indeed, they devote one section of a chapter [pp. 160-163] to demonstrating the advantages of market power and price discrimination to maximize profits. If frequency of mention of competitive market structures is the criterion of respect for such markets, the failure by C&M to use the words suggests that, unlike conventional microeconomists, their appreciation of the virtues of competitive market structures and resultant pricing outcomes is minimal. Centralized decision-making is more congenial to efficient supply chain coordination.

If it were possible to achieve complete coordination and the consequent maximization of profits, even conventional economists might sound some alarms. The profit increase would necessarily come at the expense of consumers, because (1) elimination or exclusion of firms from the chain would remove cost-reducing pressures of competition among sellers; (2) centralization of decision making, especially in the hands of the more powerful entities in the chain is unlikely to create and maintain efficiency (in the least-cost outcome sense), or to reduce profits to anything near the competitive norm. As coordination becomes entrenched among particular participants, excluded firms must either secure places in other chains or face extinction. Joined with the consolidation trends noted in an earlier section, the threat of extinction of smaller firms is not an idle one.

Lacking empirical bases of support for the belief that supply chain coordination would be generally beneficial, it is helpful to examine evidence about outcomes that contradicts the contention. We now explore such evidence of the state of actual practice of SCM and associated tactics, none of which found its way into the C&M textbook. We begin with an examination of several restrictive practices.

## **RESTRICTIVE PRACTICES: RETAIL**

### **Slotting Fees**

If SCM is about reducing uncertainty or its effects, a related and commonly used tool is the food retailers' requirement of the slotting allowance, "a lump-sum, up-front payment that a food manufacturer must pay to a supermarket for access to its shelves" [Tom 1999]. The FTC, charged with maintaining competition under the Clayton and FTC Acts, acknowledges officially that there is economic justification for these fees. They

can be reasonable offsets of retailers' costs and risks of accepting new products, such as replacing displaced products on the shelves, reprogramming the computers, and holding unsold inventory if the product does not succeed.<sup>5</sup>

The FTC has also identified activities that are clearly illegal, clearly legal, or indeterminate. The illegal act is simple bribery of a retailer's purchasing agent. The clearest kind of legal act is a price discount given the retailer in advance of sales of the product, part of which is returned if the retailer does not purchase a specified volume of the product. The unclear cases depend on circumstances, such as a large retailer's demand large advance payments that are unaffordable to small manufacturers, who are then unable to place their products on the retail shelves. In this middle ground, the agency has developed several criteria regarding competitiveness. The anticompetitive impact of the payments on the ability of competing suppliers is judged on the basis of an increasing degree of exclusion, i.e., does the payment guarantee only that the product is carried by the retailer, or in specified quantities relative to competing products, or in a preferential location, or control over the sale of competing products and exclusion of that competition, and for a short or long period of time. These standards may be applied to a single manufacturer or a group of them having a combined impact on those outside the group seeking to sell rival products. In the end, the FTC's decision reflects its focus on the harm done to "the overall level of competition" and does not always regard damage to individual competitors as a breach of the law.<sup>6</sup>

### **Channel and Category Controls.**

A form of the single-stage control advocated by C&M is the management of product flow from manufacturer to retailer through specification of "channels" and collaboration to coordinate them. Vertical collaboration evolved during the 1980s into "channel partnerships," arrangements in which food retailers and manufacturers coupled their businesses through computerized links based on bar codes and scanning technology, and data sharing on prices, inventory levels, and sales of the manufacturer's products, along with improvements in accounting practice. In this nexus, originated by Wal-Mart and Procter and Gamble, one-to-one relationships between manufacturers and retailers sought to reduce distribution costs by eliminating duplicative activities, cutting delivery times and inventory levels, and improving the manufacturer's production schedules [Cotterill 2000].

These arrangements soon expanded to multiple partners and have now evolved to "category management" and "Category Captains" and spread well beyond food retailing to the full spectrum of "mass outlets." Initiated by food retail chains, who rarely employ large staffs of credentialed specialists in "management, marketing, consumer behavior, statistics, and other relevant skills," the Category Captain is one manufacturer among those supplying a category of goods. Normally, the captaincy firm is an industry leader with "sophisticated marketing knowledge," who provides some of its firm's operating data in exchange for retailer information on operations and consumer purchases, manufacturers' and retail prices and sales data for all products in the category, including those from all competing manufacturers of products in the category. The Captain, in collaboration with the retailer's Channel Manager, decides the dimensions of the sale of all products in the category: which brands will be stocked, their prices and promotions, even where they will appear on the shelves. The goal "is to maximize the category's contribution to the [retail] chain's overhead and profit" and (with at least lip service to the concept) assuring that the shelves hold "the items consumers most desire" [Steiner, 2001].<sup>7</sup>

Proponents of the practice ("trade press and the speeches of consultants in the field") stress several requirements for success, beginning with the replacement of adversarial relationships by cooperation between manufacturer and retailer. Considerable mutual trust is essential. The Captain firm's own interests are subordinate to those of the retailer as concerns other firms manufacturing competing products to that retailer, and the retailer reciprocates by guarding the secrecy of data provided by the Captain firm. A Captain may serve in that capacity for other retailers, apparently even those in competition with each other, but is expected always to subordinate the interests of its own manufacturing firm to the achievement of maximum gain for the (each?) retailer.

While some vertical agreements of this kind may create little-recognized anticompetitive results, as the parties also become enmeshed in horizontal connections, traditionally understood anticompetitive behavior may occur. As an example of the former, a manufacturer and retailer may discover ways to cooperate on pricing so as to increase profit margins for both and neglect to pass forward to consumers the cost reductions that are heralded as rationale and justification for the arrangements. On the other hand, manufacturers and retailers traditionally attempt to increase their respective share of the retail price of products

at the expense of the other: manufacturers gain power in the relationship through advertising their national brands, while the retailer may gain by pushing a private brand [Steiner 2001].

### **Wal-Mart's SCM**

Often cited as the firm to fear as it extends its reach, Wal-Mart is the major model for successful SCM in C&M.

In Cotterill's analysis, the food SCM linkage rests in part on the power of food manufacturing oligopolies, rooted in successful product differentiation and consumer allegiance, and detrimental to the interests of retailers. However, retailers are likewise highly concentrated and use their private brands to offset manufacturer power. As the two groups cooperate, both can increase profits at the expense of consumers and upstream components of the supply chain (i.e., farmers) [Cotterill 2000, pp. 12ff].

At Wal-Mart, this "collaboration" takes the form of efficient consumer response (ECR) and EDLP. Just-in-time (JIT) inventory flows are achieved and costs reduced through leading-edge management information systems. EDLP eschews special promotions and (it is thought) results in steady retail prices set at a monopolist's level, and the firm dictates monopsonistic terms to its suppliers. In its most tightly controlled relationships, Wal-Mart (in at least some regions) negotiates a contract with a single firm for fresh chicken, another for frozen chicken, and another with fresh pork, each sold under its own brand [Cotterill 2000, p. 14].

In some instances, Wal-Mart's behavior approaches the dictatorial, hardly conducive to mutual good health for its suppliers. One example is its destruction of Rubbermaid. The latter sought higher prices from Wal-Mart to cover escalating chemical input prices. Wal-Mart refused and responded to billing at the higher rates by replacing all Rubbermaid products on its shelves with those of one of its competitors. Rubbermaid soon folded, being bought out by Newell Co. to form Newell Rubbermaid. The Rubbermaid brand soon reappeared in Wal-Mart stores. (Before its demise, Rubbermaid's relationship with Wal-Mart included several onerous requirements, such as a two-day order response, fines for "lost sales" when the deadlines were missed, buy-back of unsold product, and manufacture of product to Wal-Mart's, not Rubbermaid's specifications [Ethridge 2000, p. A11].

### **MANUFACTURING OR PROCESSING**

Producer cooperatives have effectively marketed their members' output to manufacturers and processors for decades; some sell directly to retailers. Among the former would be milk, sold by co-ops to processors under government supervision and price-fixing; the latter would include Sunkist which sells citrus fruit directly to wholesale grocers and retail chains.

The innovation here is exemplified by vertical integration in the poultry and hog industries, in which very large meat packing firms execute contracts with individual farmers to raise animals to their specifications, or establish their own production facilities for direct provision of slaughter-ready animals to their packing houses.

In the former instance, the buyer obtains a relatively stable flow of animals to the killing floor through deals with independent farm businesses on its own terms. For example, the farmer who raises chickens does not evaluate and choose among competing suppliers of chicks, feed, or pharmaceuticals, nor among competing buyers of the finished birds. The production contract provides for all such transactions to occur between the farmer and the processor who owns the chicks, feed and pharmaceuticals, as well as the finished birds. From the farmer's perspective, there is no need or opportunity to remain informed about the prices for chicks, feed, or pharmaceuticals or finished birds, for there are no longer any operable markets for them.<sup>8</sup>

Hog production runs along similar lines, with the exception that the pigs are raised in the facilities of the corporate owner rather than under contract with independent farmers. As with chickens, a whole set of market transactions are internalized to a single firm and competition to supply the retail market is eliminated. As previously noted, similar movements are beginning to appear in the beef industry, in the form of packers owning captive supplies of animals or entering into contracts with some feeders to bypass the uncertainties of open market transactions.

## CONCLUSIONS

Undergraduate instruction of business majors has serious deficiencies. The mandatory course in microeconomics fails to acquaint them with reality, requiring major correction and extension beyond the facile diagrams of price determination. As suggested by this paper's examination of agriculture and food provision, their understanding of market structures must be drastically modified to emphasize the existence and exercise of great market power within the food system. New understandings of antitrust policy in vertical relationships are required. The non-price elements of the food system must be more extensively presented, including the interdependencies among urban food consumers and rural food providers and their communities. Professors with Institutionalist convictions will regard this as standard practice; their conventionally oriented peers will have difficulty in setting aside their price-quantity diagrams to discuss such matters.

Academic preparation in SCM is also wanting. Failure to recognize antitrust implications will bolster a disdain for the importance of legal constraints on business decisions. Trends in consolidation that portend an accelerating demise of small businesses are likely to be of slight concern to people committed to achieving supply chain efficiencies, and they are likewise able to avoid anxiety about other damaging effects of centralized decision-making and the ruin of smallish businesses.

Mitigating these consequences may be of little interest to SCM faculty, as they perceive their work to be the preparation of employees who understand and can facilitate the functioning of supply chains. However, recapitulation of some of the public policy issues raised in microeconomics could prepare their students to appreciate the value of some of their other required courses, e.g., ethics. Recognition that adverse social and economic outcomes are probable and of serious moment might be stimulated by inclusion of material on actual practice such as we have presented.

Conventional economists, eager to fashion youthful Marshallians, may also be uninterested in restructuring their work. However, if the accrediting process for business schools has serious meaning for those involved, such restructuring should be undertaken. Plans for "integrating the core courses" should encourage the economics faculty to incorporate material from the vocational business courses into their presentations, to learn for themselves how divorced from actual business practice their theories and equations really are, and perhaps to make their arguments more credible to their relatively resistant students.

## ENDNOTES

1. Hayden presciently noted several other issues, including two of concern for this paper: “price fixing in meat markets (and) the acquisition and control of the world’s seed germplasm by a few large global companies” [186].
2. A class action suit with 30,000 potential plaintiffs is in process against IBP, now a part of Tyson, for captive supply practices: “buying mostly packer-owned cattle and cattle committed to packers under long-term contracts – rather than bidding on auction markets – to unfairly depress prices paid to producers” [Niese 2001].
3. In this, the business disciplines are probably more soundly grounded in empirical observation than is microeconomics, which is almost completely devoid of empirical referents.
4. In economics, we would say simply that the purpose of business activity is to maximize profits, the difference between total revenue and total cost. Perhaps some symbolic end is served by calling this “value,” but the improvement is certainly obscure to the economist’s mind, and the reason for holding that value, as they define it, and profit are merely “strongly correlated” and not identical is surely strange. Since this is the only occasion upon which they refer to the expenditure of “effort” rather than cost, it may represent a momentary lapse of concentration.
5. The average supermarket stocks 30,000 items, but fully 100,000 grocery products are available from manufacturers, and another 10-15,000 new ones are offered each year [Tom 1999].
6. In business for more than twenty years, Mi Ranchito manufactures tortilla chips in a small factory in Phoenix. The firm employs 18 people, but has cut some hours to 32 per week and some workers have left for more stable jobs. While the chips were sold in “every major grocery chain” in the metropolitan area in 1991, today only three chains stores continue to carry the chips, and sales declined from \$3.5 million in 1992 to \$1 million in 1998. Owners of the company locate their problem in competition from Frito-Lay, “. . . which offers stores compensation for increased space, including premium spots at the ends of aisles, ‘slotting fees’ for new displays, and marketing deals (the) company could never afford.” The company formerly advertised its chips at the Fiesta Bowl, but Frito-Lay “now sponsors the game and renamed it after its Tostitos chips.” The big company “says it’s doing nothing wrong and is merely an aggressive player in a competitive business. ‘It is not our intention to drive small regional companies out of business, but the business environment probably has been difficult for small companies,’ Frito-Lay spokeswoman Lynn Markley said.” The U. S. Justice Department showed some interest in 1996 in Frito-Lay’s practices, but has not contacted the firm in a year, and The Attorney General of Arizona has not taken any action. “Frito-Lay said it faces plenty of competition from such chip companies as Mission and Poore Bros” [Creno, Glen, “Little firm down in its chips,” *The Arizona Republic* 7 July 1998, p. D1].
7. Note that this presentation is not concerned with total supply chain profits, probably because that focus is not encountered much in actual practice.
8. The contract also provides that the processor will duly inform the farmer of the cost of chicks, feed, pharmaceuticals, the average price for the finished birds in the region where they were raised, and the price that will be paid to the farmer. The farmer is typically responsible for any dead birds and their disposal, as well as disposal of the wastes associated with the production process. The farmer does hold title to the buildings that house the birds, because the contract also provides that the farmer sees to the construction and maintenance of the structures, for which the contract specifies the architectural criteria. See the website of the National Contract Poultry Growers [<http://www.web-span.com/pgs/contracts/contractsindex.html>] for examples of the kinds of contracts that govern the industry.

## BIBLIOGRAPHY

- Barkema, Alan and Mark Drabenstott. "Consolidation and Change in Heartland Agriculture." Federal Reserve Bank of Kansas City: *Economic Forces Shaping the Rural Heartland, 1996*. <http://www.frb.org>.
- Castle, Emery N. "Agricultural Industrialization in the American Countryside." Henry A. Wallace Institute for Alternative Agriculture. October 1988. <http://www.hawiaa.org/pspr7.htm>.
- Chopra, Sunil and Peter Meindl. *Supply Chain Management: Strategy, Planning, and Operation*. Upper Saddle River, N.J., Prentice-Hall, 2001.
- Cooper, Martha C., Douglas M. Lambert, and Janus D. Pagh. "Supply Chain Management: More Than a New Name for Logistics." *International Journal of Logistics Management*. V. 8, No. 1, pp. 1-14.
- Cotterill, Ronald W. "Dynamic Explanations of Industry Structure and Performance." Research Report No. 53, Food Marketing Policy, University of Connecticut. April 2000.
- "Policy Editorial: Food Industry Consolidation: The Uncharted Global Venue" *Food Marketing Policy Center Newsletter*. V 6, No. 2, April 1999, pp. 1-2.  
[http://www.vt.uconn.edu/~%7Ecotteril/nl6\\_2\\_.pdf](http://www.vt.uconn.edu/~%7Ecotteril/nl6_2_.pdf)
- Drabenstott, Mark. "This Little Piggy Went to Market: Will the New Pork Industry Call the Heartland Home?" Federal Reserve Bank of Kansas City: *Economic Review*. Third Quarter 1998. pp. 79-97.  
<http://www.frb.org>.
- and Tim R. Smith. "The Changing Economy of the Rural Heartland." Federal Reserve Bank of Kansas City: *Economic Forces Shaping the Rural Heartland, 1996*. <http://www.frb.org>.
- Ethridge, Mary. "Big Chains Rule Industry." *Akron Beacon Journal*. 16 July 2000. pp. A1, A10.
- "Rubbermaid Suffers in Battling Wal-Mart." *Akron Beacon Journal*. 16 July 2000. p. A11.
- Foer, Albert A. "Divestiture and the Category Captain: New Considerations in Merger Remedies." *FTC Watch* No. 577. Washington, D.C., American Antitrust Institute. November 19, 2001.  
<http://www.antitrustinstitute.org/activities.cfm>.
- "Food Retailing: The Two Faces of Supermarket Mergers." <http://www.antitrustinstitute.org/recent/37.cfm>
- and Robert H. Lande. "The Evolution of United States Antitrust Law: The Past, Present, and (Possible) Future." American Antitrust Institute, October 20, 1999. <http://www.antitrustinstitute.org/recent/64.cfm>.
- Gidley, J. Mark. "Comments Regarding Slotting Allowances and Other Grocery Marketing Practices." <http://www.ftc.gov/bc/slotting/comments/006jmarkgidley.pdf>
- Griffin. "Stop & Shop Leads List of 18 Chain." *The Griffin Report of Food Marketing*. V. 30, No. 6, June 1995. <http://www.interac.com/griffin/griffin.htm>.
- Hayden, F. Gregory. "A Geobased National Agricultural Policy for Rural Community Enhancement, Environmental Vitality, and Income Stabilization." *Journal of Economic Issues*. V. XVIII, No. 1, March 1984. pp. 181-221.
- Heffernan, William. "Consolidation in the Food and Agriculture System." Report to the National Farmers Union, 5 February 1999. <http://www.nfu.org>.
- Heizer, Jay and Barry Render. *Operations Management*. Upper Saddle River, N.J.: Prentice Hall. 1999.
- Hirzel, Karl A. "Comments Regarding Slotting Allowances and Other Grocery Marketing Practices." <http://www.ftc.gov/bc/slotting/comments/hirzelcanningco.pdf>
- Hover, Harwood, Jr. "Pricing Behavior of Deregulated Motor Common Carriers." *Transportation Journal*. V. 25, Winter 1985. pp. 55-61.

- Kellerman, Bert J. "The Impact of 1994's Further Deregulation of the Trucking Industry: The Rural Shippers' View." *Journal of Marketing Theory and Practice*. Special Issue, Fall 1998, V. 6, No. 4. pp. 92-103.
- Kranz, Steve. "What Is It?" *Purchasing Today*. October 1996, V. 4., pp. -----
- Larson, Paul. D. and Dale S. Rogers, "Supply Chain Management: Definition, Growth and Applications." *Journal of Marketing Theory and Practice*, Special Issue, Fall 1998. V. 6, No. 4. pp. 1-5
- Metz, Peter J. "Demystifying Supply Chain Management." *Supply Chain Management Review*. Winter 1998. pp. ----
- Murphy, Paul R. and Patricia K. Hall. "The Relative Importance of Cost and Service in Freight Transportation Choice Before and After Deregulation: An Update." *Transportation Journal*. V. 35, No. 1, pp. 30-38.
- Niesse, Mark. "Cattlemen's Case Gets Class-Action Status." *Associated Press* 28 December 2001.
- Porter, Michael E. *Competitive Advantage: Creating and Sustaining Superior Performance*. New York: The Free Press, 1985.
- "Raise Prices, Wal-Mart Told." *Associated Press*. Reprinted in *The Arizona Republic*, 9 September 2000, P. D1.
- Reidy, Chris. "Wal-Mart Threat Sets Stage for Food Chain Fight." *Boston Globe*. 22 February 2002. [http://www.boston.com/dailyglobe2/053/business/Wal\\_Mart\\_threat\\_sets\\_stage\\_for\\_food\\_chain\\_fight+.shtml](http://www.boston.com/dailyglobe2/053/business/Wal_Mart_threat_sets_stage_for_food_chain_fight+.shtml).
- Salop, Steven. "Comments Regarding Slotting Allowances and Other Grocery Marketing Practices." <http://www.ftc.gov/bc/slotting/comments/010stevensalop.pdf>
- Skitol, Robert A. and Kathleen S. O'Neill. "Petition to the Federal Trade Commission on Behalf of The Independent Bakers Association, the Tortilla Industry Association, and the National Association of Chewing Gum Manufacturers for the Issuance and Enforcement of Guidelines on Slotting Allowances in the Grocery Industry. 14 April 2000. <http://www.antitrustinstitute.org/recent/63.cfm>.
- Steiner, Robert L. "Category Management – A Pervasive, New Vertical/Horizontal Format." *Antitrust*, Spring 2001, pp. 77-81.
- Sussman, Donald. "Comments Regarding Slotting Allowances and Other Grocery Marketing Practices." Statement of Donald Sussman, Executive Vice President, Supply Chain Management, Ahold USA, Inc. <http://www.ftc.gov/bc/slotting/comments/005aholdusa.pdf>
- Tom, Willard K. "Slotting Allowances and the Antitrust Laws." Testimony of the Federal Trade Commission before the Committee on the Judiciary, U. S. House of Representatives. October 20, 1999. <http://www.ftc.gov/os/1999/9910/slotting991020.htm>
- "Wal-Mart Price Cuts at Issue." *Associated Press*. Reprinted in *The Arizona Republic*, 27 September 2000, p. A1.
- Walton, Bruce and Michael Princi. "From Supply Chain to Collaborative Network: Case Studies in the Food Industry." Andersen Consulting, 2000. <http://Walton.ASCET.com>
- Welsh, Rick. "The Industrial Reorganization of U. S. Agriculture: An Overview and Background Report. Henry A. Wallace Institute for Alternative Agriculture. April 1996. <http://www.hawiaa.org/pspr6.htm>.
- , "Reorganizing U. S. Agriculture: The Rise of Industrial Agriculture and Direct Marketing." Henry A. Wallace Institute for Alternative Agriculture. August 1997. <http://www.hawiaa.org/pspr11.htm>.