Preface

In Vino Veritas?

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Is there truth in wine as Pliny said? Or is there just a brief flash of delusive (if delightful) insight that soon gives way to dullness? I shall leave that to readers of this preface to decide. But as I read the intriguing essays in this book I was frequently reminded of the eighteenth- and nineteenth-century wine trade. Before I try to show why, I must quickly acknowledge that, as Abernathy et al. wisely note in their chapter, there is undoubtedly something profoundly new about the new globalization. It is this new new thing that the different case studies and Kenney's and Kogut's broad overviews address so well. Nonetheless, historians of earlier global trade will find in these exemplary case studies much that is familiar. In the wine trade, for example, as in the modern economy, commodities came from numerous competing points of production, covered vast distances, and passed through multiple hands to reach the major international market. Before the twentieth century, that major market was Britain. Here production was negligible, but because consumption was prodigious, merchants could exert significant influence back along the whole chain. This collection makes a similar point about supply chains that lead from overseas production to consumers in the United States, where production dwindles as consumption grows, and with it control over the supply chain.[1]

But, critically, these essays are not simply about chains, industries, or markets. They are also about particular firms. Directly or indirectly, each essay records the ability of particular firms—specific links in these long supply chains—to achieve relative autonomy, and in the process assert control over the chain as a whole without, intriguingly, having to resort to formal inte-

gration. This "action at a distance"—both spatially and organizationally—is a distinctive feature of the new globalization, as firms disaggregate the old hierarchical forms. There are, in particular, several discussions here of "pressures" and "squeezes" exerted by dominant players over subordinate ones. While there are many clear examples, the most outstanding is surely McKendrick's stark account that 196 million disk drives are manufactured by eight firms but result in no significant profit. That is a squeeze indeed.

Such examples of supply chain subordination prompt me to wonder who gets to dominate, how, and how they manage to hold on, despite the dramatic pace of change that Kenney rightly emphasizes in his introduction. Clearly, many of the successful firms described here have risen to both prominence and relative dominance in their particular supply chain without having to assume formal upstream or downstream control through integration. Yet from what point they dominate seems highly variable. Sometimes it's retail (Wal-Mart in clothing and apparel markets), sometimes it's an OEM (Dell and Hewlett Packard, whose rise up Curry and Kenney's Table 5.2 is perhaps as remarkable as it is unremarked, in the PC market),[2] sometimes it's a major producer (Intel in the chip business), and sometimes (though not a central topic of discussion here) a software firm (such as Microsoft in the PC value chain). Undoubtedly, there are numerous contributing factors, many with a particularly modern character, and several that are quite industry specific. But this action at a distance, this struggle for dominance in global supply chains, was also, I shall try to show, a distinctive feature of the old globalization. So a look at the era when firms traded globally (admittedly in a smaller world) but before they were hierarchically integrated might still throw some light on the challenges facing globally active firms today now that many have disaggregated.[3]

A brief glance at a longish *durée* (some two hundred years) in the history of the port wine trade reveals power similarly accruing to particular points in the chain, allowing particular firms not only to compete effectively with rivals but also to dominate their suppliers and even their customers. For while they must cooperate, links in these chains inevitably live in tension with one another. And as the case studies here suggest, significant rents accrue to the dominant link while others both up and down the chain get squeezed. (We'd surely all rather be Intel than a beleaguered packaging and testing house in Southeast Asia.) "Winning" the game of "vertical competition," as Curry and Kenney suggest, can be as important (and rewarding) as beating your competitors in the marketplace.

A Short History of the Port Trade

If, as several writers in this volume claim, history matters, then wine should certainly tell us something about international trade. It is one of the oldest international commodities. Heroditus speaks of boats carrying wine to Babylon in the sixth century B.C.E. A century later, Greek trade was sufficiently important (and lucrative) to be the subject of legislation. Pliny's *Natural History* includes some forty foreign wines among the ninety varieties available in Rome at the beginning of the Christian era. If the Dark Ages were not much kinder to wine than to learning (Goths, Vandals, and Huns, with their strong preference for beer and violence, seem to have been the linear ancestors of Britain's "lager louts"), the Middle Ages saw a resurgence in both, with monastic vineyards, as productive as their libraries, fostering trade from the vine-rich regions of the Mediterranean and southern Europe to the colder regions in the north. The wine trade grew with the European economy and wine merchants proved eager, restless entrepreneurs.

As often happens with transnational trade, England's thirst for foreign-produced commodities came into conflict with its foreign policy. France became as natural an enemy as it was a natural source for wine. With the English government repeatedly embargoing French wine, diplomacy as much as supply constrained demand. Portugal, eager for a Protestant ally to keep it free of the predatory Catholic power over its border, was an obvious alternative. For England, there were other wine-producing options. But Portugal had an Atlantic-facing coast: proximity to major markets, as so many authors here note, helps.

The year 1703 marked a significant point in this blend of trade and diplomacy. The queen of England and the king of Portugal signed the Methuen Treaty guaranteeing Portuguese wine lower duties than French wine in England. In return, it guaranteed to English woolens unfettered access to Portugal. Addressing central issues of international trade—comparative advantage and the international division of labor, in particular—the treaty is of interest to more than wine (or textile) historians. Adam Smith saw in the treaty an invidious tax on domestic consumers. The Methuen advantage, in his eyes, was all Portugal's. The Anglo-Portuguese economist Ricardo, however, saw things quite differently. Such trade, he thought, allowed the two countries with complementary assets to gain comparative advantage. More recent analysis of Anglo-Portuguese trade (Sideri 1970) tipped this balance once more, but in the opposite direction to Smith. In short-term annual budgetary balances, the two may have shown comparative advantage, but not in long-term development. The complementary assets represented, on England's side, the rising industrial economy, but on Portugal's side, the falling,

agricultural economy. So England developed its “new economy,” while Portugal, under physiocratic governments, was left with the old.

Several of the essays in this volume (in particular, Linden et al.) do show labor divided principally between high value-added work in one part of the world and low value-added “old economy” assembly work elsewhere. Much of Western Europe, Japan, and the United States works in the knowledge economy; the people of Southeast Asia, China, and Mexico are more likely to work for it. Consequently, modern debates over the benefits of this form of globalization sound strikingly similar to those initiated by Smith and Ricardo over the Methuen Treaty. Yet, as Leachman and Leachman show, Taiwan’s semiconductor manufacturing is in the forefront of innovation and has proven sustainable and very profitable. Similarly, as McKendrick’s study suggests, Singapore has benefited greatly by becoming the global manufacturing headquarters for hard disk drives. In other words, these papers do show that not all manufacturing regions can be assigned to the “old economy.” The challenge raised by all these papers and faced by governments around the developing world, then, is to understand the different conditions and outcomes of comparative advantage in globalization.

The Methuen Treaty raises one more critical yet controversial topic that recurs throughout these essays: government intervention. The bilateral arrangements for textiles allowed under MFA (Abernathy et al.) has clear antecedents in the Methuen Treaty, as, in their way, do the local content (Sturgeon and Florida) and antidumping (Murtha et al.) laws: these serve, much as the discriminatory wine tax against the French, to keep undesired goods out of a particular market.

The early history of the port trade is rife with government intervention. Wine was not only much desired but also shipped in bulk containers. Consequently it was an easily taxed commodity. From the Methuen Treaty on, British governments continuously tinkered with the fiscal arrangements for its most popular wine until, with Gladstone’s “single bottle” act of 1860, port finally lost its exceptional status. From their end, Portuguese governments sought to promote (and feed their treasury from) this important trade. Faced with increasing disarray in the 1750s, the Portuguese demarcated the port wine region—the Alto (or upper) Douro River valley where the port grapes are grown. (Port takes its name from the city of Oporto, the entrepôt at the mouth of the Douro River.) This demarcation survived until 1834, when a new, economically liberal Portuguese government removed all regulation. (Curiously, this deregulation occurred just as other countries started to adopt this innovative idea—one that is echoed not only in modern wine regions but also in maquiladoras, free ports, and other types of fiscally privileged zones.)

The end of regulation spurred a burst of globalization impressive even by today's standards. Before the lifting of restrictions, wine had flowed principally to Great Britain and Ireland, with lesser amounts trickling to northern Europe and to outposts of the Portuguese and British empires. Upon liberalization, these trickles swelled. The widely connected port merchants sent wine to Baltimore, Boston, New York, and Philadelphia; to Halifax, Newfoundland, Quebec, and Nova Scotia; to Archangel, Riga, and St. Petersburg; to Amsterdam, Bremen, Copenhagen, Genoa, Hamburg, Stettin, and Stockholm; to Tenerife, Madeira, and the Canaries; to the Cape of Good Hope, Jamaica, St. Johns, Barbados, and Demerara; to Pernambuco, Valparaiso, and Batavia; to Hobart, Sydney, Bombay, Calcutta, and Madras; and to Jersey and Guernsey. Only Asia and Antarctica are missing from this global sweep.

As this expansion indicates, as merchant accounts show, and as historians remind us, the merchants of the past were integrated into far-flung trading networks. Most merchants needed fewer than six degrees of separation to span the globe.[4] When opportunity arose, relatively passive links between merchants on opposite sides of the globe turned into active trading relations with extraordinary speed, allowing merchants to practice arbitrage in both goods and bills of exchange across space and time—a practice still vital, as I suggest below, to globalization today.

Struggle in the Supply Chain

Unfortunately, for those who see in this dramatic expansion of the port trade a clear lesson about the benefits of trade liberalization, boom swiftly turned to bust. Low-cost imitations, potent substitutions, falling reputation, dwindling protection, and widespread falsification made the previously complacent port trade struggle to protect its appeal and reputation, in the short term, and its markets in the long. The highly disaggregated supply chain made such organization complicated. But the way in which the port trade took on this task is instructive.

This unruly chain began in the Alto Douro with the smallest farmers who sold grapes to big farmers. With these and their own larger crops, the big farmers made wine. To this they added brandy (one of the distinguishing features of port) to stabilize the wine, which they stored through winter. As stockholding is expensive and risky, all but the wealthiest farmers hoped to sell their wine in early spring to either brokers or exporters who then took the wine to Oporto. There more brandy was added, the wine was stored (young port is harsh and crude) before exporters blended it for export (using their own stocks and, if these fell short, those of brokers), and it was shipped

to British ports in response to orders from importers. These sold the wine to hoteliers, innkeepers, wine merchants, and retailers, who in turn sold to consumers.

Most tensions in this chain revolve around stockholding. Wine was costly and volatile. When it moved, high duties had to be paid. When it sat, it tied up large amounts of capital. If it aged well, it could command high prices to justify the investment. But stocks could both deteriorate (aging a product that can literally go sour is always risky) or depreciate if the next year's wine was better. Furthermore, taste and fashion fluctuated rapidly and unpredictably. No one wanted to be caught holding depreciating stocks. Yet no one wanted to be out of wine when the market surged. (For this reason, the brokers, a little like Ingram's and other wholesalers today, played a critical role in the chain, providing just-in-time wine.)

So the port chain faced many of the stockholding issues discussed in this volume: from the textile industry, with its volatile fashions, to the auto industry, with its high-cost components, to the PC, chip, and hard-disk industry, with their rapidly depreciating components. Port, like the PC (Curry and Kenney) and its various components, especially semiconductors (Leachman and Leachman) and hard disk drives (McKendrick), and garments (Abernathy et al.), had some of the properties of Curry's and Kenney's "hot potato." Everyone wanted adequate supply, but not the stockholding risks. Each link sought to pass these to someone else up or down the chain. As Sturgeon and Florida suggest, this urge to transfer stockholding risks may even explain the way in which objects are designed. The modularity of the PC and the car allows not only for distributed production but also for the easy transfer of stockholding from more powerful to less powerful participants. Port, too, had "design features" that allowed such transfers. Standard explanations of the brandy it contains are enological. Some explanations, however, are more strategic, arguing that brandy was added because, though it did not affect the time needed for the wine to become drinkable, it decreased the time it needed to become transportable (Thudichum and Dupré, 1872). Thus brandy allowed the farmers to pass the cost of storage to exporters and exporters to pass it to importers. In response, the importers engaged in a "blend-to-order" policy, a little like Dell's "built-to-order" strategy. Blending to order, while allowing customers greater choice, allowed importers to pass such customized wine hurriedly to customers (in this case, merchants, inns, hotels, and retailers). If these could not as quickly persuade the end user either to "lay down" venerable wine or to drink cheap wine, they ended up as the most likely candidates to bear the cost in this supply-chain game of pass the parcel.[5] But retailers and wine-merchants (described by one port merchant as "the most rotten set in London") had a tendency to

default on payments, causing tremors all down the chain. So a great deal of what Abernathy et al. call "short cycle" storage fell to the more solvent importers in Britain, while the "long cycle" storage fell to the exporters in Oporto. As these two were also often closely linked through interlocking shareholdings, inevitably it was these two that pushed to organize the supply chain in their particular interests.

They faced, of course, competition from others in the chain, each of whom no doubt realized that those who did not squeeze would instead be squeezed. So, farmers sought to put their stamp on the trade, appealing implicitly to the concept of *terroir* to turn the brand they burned on their barrels into recognizable signs of quality assurance in the retail marketplace. Here, in a nationally divided trade, they were probably undone as much by the historic Portuguese demarcation as by their British "vertical competitors." Whereas in France, in the absence of strict demarcation, the names of particular chateaux became a sign of reliability, in Portugal the demarcation and the tradition of blending wines from different estates at export tended to obscure the role and name of the originating farmers. Nonetheless, certain estates (such as Roriz) did acquire a reputation in Britain as, on the one hand, wine merchants used them as tokens of quality, and on the other, farmers tried to subordinate the supply line, diminish the role of middlemen, and establish their own outlets in Britain.

At the opposite end of the chain, wine merchants sought to overcome their bad collective name and establish individual good ones. They were aided by the fact that port in the nineteenth century was more or less anonymous. It was advertised as "good," "strong," "rich," "natural," "old," and the like, but just as the names of the originating chateaux (or *quintas,* as they are known in Portugal) were obscured, so were those of most of the middlemen. Instead, wine merchants in Britain offered their names as the distinguishing feature. The practice starts early. *The Daily Courant* of 1703 and after, for example, advertises many generic wines (port, lisbon, claret, burgundy, and the like). The only proprietary names that appear are those of wine merchants and innkeepers. Slowly wine merchants grasped the significance of this position. Advertisements for port and sherry for sale at H. B. Fearon's turn subtly into advertisements for "H. B. Fearon's port." By the mid–nineteenth century, the new names in wine marketing and retailing—Hedges & Butler, Gilbey's, Victoria Wines—required exporters in Portugal to bottle port in Oporto with proprietary labels and corks as if Hedges & Butler, Gilbey's, and Victoria Wines had their own Oporto operation. In the process, they increasingly standardized their product for multiple retail outlets so that, as one historian puts it, "a Gilbey claret bought at Reading, say, should have the same look and taste as a claret bought in Wolverhampton

. . . a consumer in other words, could learn to rely on a Gilbey's label. . . . They marketed standard brands."[6]

In effect, the retailers were transforming their strategy from the equivalent of the "build to order" (BTO) strategy, familiar in the modern PC market, to the equivalent of "buyers' own brand" (BOB) retailing, familiar in the modern food and wine industry, whereby, once again, retailers get their name on the label while their suppliers become anonymous and interchangeable.

Standards and Brands

Two things relevant to both past and present are I hope evident by now. First, as the quotation above indicates, the struggle ran along, not across, supply chains. If retailers established the identity, standardization, and reliability of the wine this way, they effectively made all others in the chain anonymous and put in their own hands effective control of the disaggregated chain. (If one supplier caused problems, Gilbey's could—and did—switch to another without customers being any the wiser.) Second, the key weapons in this struggle are standards and brands. If you can establish a reliable standard that is as predictable in Wolverhampton as Reading, if you can associate your name with that standard, and if you can protect that name, then you can grow from niche to mass markets and make others dance to your tune. Hence the triumphantly (if, for some, only transitorily) significant names invoked in this volume—Nike, Wal-Mart, Dell, HP, Zenith, Sharp, Intel, Microsoft, Sony, AMD, Jeep, Volkswagen, Nokia, and Motorola.

So in the middle of the century the wine trade in general became a rather familiar battle of standards and names. "Tawny" (once an insult) turned into the term for one particular category of wine. "Vintage" port was transformed from a general to a specific term to designate wine aged for the high-end market. And "ruby" was introduced to characterize the wine for the cheap market.[7] And firm names known today—not only Hedges & Butler, Gilbey's, and Victoria but also Cockburn, Graham, Sandeman, Taylors, and Roriz—became prominent and valuable trademarks. In homage to their value, these names were rapidly flattered by imitators, appropriated by fraudsters, protected by courts, alienated in sales, and seriously cultivated by owners.

What is noticeable about this list, as well as its modern equivalent above, is that neither represents only one particular point in the supply chain. Wal-Mart and Victoria are retailers, HP and Sandeman are intermediators, Intel and Roriz are producers. Although they occupy different points in the chain, each manages to stake a claim for itself.

Of particular interest are the intermediators, who might seem to have no

essential role to play. Indeed, one contemporary champion of the farmers insisted in 1883 that with "the compression of space and time," farmers should be able to sell to consumers without any rent-seekers intervening. The language remains fresh in debates about disintermediation today.

But while some were cut out and others subordinated, a few intermediators did manage to take charge of their own supply chain. Although wine merchants and retailers pushed to make themselves the ones whose name would become the brand, they suffered, as I noted, from their own notoriety and the regularity with which their names appeared in lists of bankrupts. The generally short lives of retailers made them a risky source for wines that the buyer might not get to drink for one, two, or more decades. To whom would you protest if the wine turned out bad, but the retailer went under twenty years ago? Better established merchants fought this by broadcasting their age ("Established Upwards of 45 Years," "Importers for 40 Years," "Established 1793," and so forth). But they also started to use the more enduring names of suppliers. Thus, while retailers like Gilbey's sought to make their suppliers anonymous, others boasted that their port was Sandeman's, Cockburn's, or Offley's "shipping." Such claims played the role that the label "Intel inside" plays for low-end PC assemblers or VARs, providing for purchasers a warranty of quality that the VAR itself lacks credentials to provide.

But unlike Intel's trademarked claim, exporters' names were not necessarily used with permission—nor even with the exporter's wine. Thus the exporters themselves moved to protect their own name, and in the process to promote their brand over that of the retailers and the farmers. They did this in a variety of ways. They participated in the standard setting for the main types of wine ("tawny," "vintage," and "ruby"), as described above. They increasingly took over bottling.[8] (Wine had previously been bottled at a variety of different points in the chain: exporter, importer, retailer, and even consumer.) And they began to promote their brands as available "at most respectable retail houses." In so doing, they suggested to consumers that, while the importer was essential, retailers played an inconsequential and substitutable role in supply.[9] And so, with standard and brand strategies of their own, they fought back against the retailers in the tussle to see who could both assert their own brand and blot out that of their vertical competitor.

Yet, as is usually the case with vertical competition, cooperation was also important. Exporters, importers, and retailers needed each other, and were often complicit in others' competitive strategies. As Acer both manufactures PCs under its own name and assembles computers for competitors, so port firms like Sandeman provided both Sandeman-branded port and retailer-branded port (for Gilbey's). Here the exporter wisely segmented the market,

allowing the new retail chains to service the cheaper end of the market with "buyers' own brands," while promoting their own name on high-end and vintage wines.[10]

Arbitrage in the Space of Flows

There are, then, intriguing parallels between nineteenth- and twenty-first-century global chains. But can it be said that the age of sail and steam can tell us truths about what has grandly been called the "space of flows" (Castells 1996)? I believe it can. In particular, the parallels help emphasize that it is not only the length of the globalized supply chain that is of interest. We need to note as well its particular shape and the topography of power that it instantiates. The parallels also suggest that, while many explanations of modern supply chain management have technological causes, these may be necessary but not sufficient. Business process innovation, in particular the skillful manipulation of brands, has proved an effective means to shape a supply chain.[11] And thus overheated rhetoric about a new economy built on new technology is likely to miss critical aspects of where value is added (and rents extracted) in the flow of goods and information.

Indeed, old and new juxtaposed particularly help understand the limits to claims about the "compression of space and time." A key word here, which I mentioned above, is *arbitrage*. Global businesses, both old and new, make their money through arbitrage between prices at the point of production and prices at the point of consumption.[12] For arbitrage to be possible, the flow between these two places has to be impeded, by government regulation and borders, by coordination and communication problems, by transportation costs, and so forth. While these remain, intermediaries, arbitraging across the barriers, will also remain. (Disintermediation, that is to say, is not the same thing as disaggregation.)

Much as histories of the port trade need to understand the impediments it faced, so the essays in this volume, then, are all in their way studies of modern impediments to flow and the resulting arbitrage. The flow of material goods is constrained by tariffs, embargoes, prejudice, but also, more simply, by transportation, its time and costs. The river and the estuary, so important to the growth of the port trade, have perhaps today been replaced by such things as the highway and the FedEx airport hub. More adaptable than rivers, these new interchanges nonetheless have a significant determining relationship on global flow and continue to ensure, in Kogut's words, that "we never escape the pull of geography." The magic of a communications infrastructure will not magically lift those without transportation infrastructure into

the "new economy," in part because aspirants to the new usually have to prove their value by working on material goods, not informational ones.

Less discussed in these pages, but ever present, are the impediments to the flow of labor and their role in the ensuing global arbitrage of wages. The space of flows, an informational concept, does not readily allow for the flow of labor. Thus many people remain inescapably trapped in low-wage areas, making arbitrage by intermediaries easier. In several of the cases outlined here, arbitrageurs have to balance the price of goods and labor in the form of weight and wages. Goods that are cheap to transport, such as DRAM, can be sourced from the accessible lowest-wage areas. Those that are too heavy to transport either cheaply or quickly, such as car engines, come from points geographically closer to the market. So, because of impediments to the flow of goods and labor, countries can still gain disproportionately, rather as Portugal did, from the serendipity of proximity. The dramatic differences, despite other similarities, between FDI and GDP in Ireland and New Zealand would seem to bear this out. Distance is not dead.

Capital, of course, flows more readily than either goods or labor. It always did. (The original commercial meaning of *arbitrage* referred to the trade of bills of exchange between markets to take advantage of different currency rates.) Here too, however, the essays note that flow is not completely unimpeded. Modern global firms, these essays remind, have also to be skilled at arbitraging around currency fluctuation, as Oporto merchants were before them.[15] Today, instead of just moving cash to counter unfavorable shifts in exchange, supply chains move production itself to other regions. A weak but relatively stable exchange rate with the dollar can thus be a great asset, though investing arbitrageurs are in part investing in the stability of that weakness.

Finally and intriguingly, the essays remind us that knowledge does not, as many seem to feel it must, escape the pull of geography. There are impediments to the flow of knowledge. Yet, while we can understand that port merchants clustered in Oporto, because that's where the commodity comes from, it isn't as easy to see why knowledge also clusters. Gilder would have us believe that in the telecosm, "anyone can transmit any amount of information, any experience, any opportunity to anyone or everyone, anywhere, at any time, instantaneously, without barriers of convenience or cost, the resulting transformation becomes a transfiguration" (Gilder 2000: 263–64). But in reality the world still resembles the world of the port merchants, where dominant clusters in one place exert distal control over distributed supply chains. Today the critical clusters are, in fact, knowledge clusters. They are found in places like Silicon Valley, Route 128, Fairfax, Virginia, De-

troit, and in similar spots around the United States and the developed world. In these places the design work, the high-value intellectual property, increasing returns, and even increasing control continue to reside, as most of these essays emphasize. Indeed, paradoxically it is knowledge workers, whose labor is in theory independent of location, who apparently need (and are allowed) to travel most. So Silicon Valley becomes increasingly polyglot, and the knowledge economy appears to concentrate in the United States. As the essays here indicate, the international division of labor is increasingly a division between knowledge work, which clusters in the metropoles (though the movement of the laborers is relatively unrestricted), and manual labor, which flows around the globe to fit with new supply chains (though the movements of the laborers are highly restricted as the global supply chain spreads and disaggregates to allow for arbitrage).

Arbitrage, it's worth noting, initially referred to a capacity for self-determination, which is the converse of subordination. And, as I have tried to show and the following essays wonderfully illustrate, in the new global supply chains as in the old, participants struggle to achieve self-determination. The stakes are high. The losers face subordination or even bankruptcy. And technological shifts alone are not enough to unpick the lock that location and brands can give the winners.

Notes

1. I accept Kenney's reservation that a chain is not necessarily a good metaphor, but as it is the generally accepted one, I use it here.

2. Given its recent decision to purchase Compaq and the well known difficulty that technology firms have in integrating mergers, the meteoric rise of Hewlett Packard may presage a similarly dramatic fall.

3. These comments draw heavily on two important, recent, and historically informed treatises: one by Gary Fields (2003), which compares Dell's reorganization of the PC supply chain in the late twentieth century with the rise of the Net to Swift's reorganization of meat packing in the late nineteenth century with the rise of the railway; the other by Teresa da Silva Lopes (2002), which looks at both the integration and disintegration of supply chains in the alcoholic beverage industry at the end of the twentieth century. Where Fields stresses the significance of technological innovation, Silva Lopes stresses innovations in marketing, branding, and intellectual property.

4. See in particular Woolf (1982), Curtin (1984), and Hancock (1995).

5. As the century progressed, the novelist Anthony Trollope (1927) noted, consumers increasingly expected wine merchants to stock high-quality wine, allowing consumers to send "for a dozen at a time, and wisely impose upon [the merchant] the duty of keeping the wine,—and charging for the capital required" (p. 76).

6. Waugh (1957), pp. 18 and 19.

7. At about the same time, the French were classifying their grand cru.

8. In this they followed the lead of the Champagne houses, who had imposed their name on the trade by bottling in France rather than in Britain.

9. Here port exporters were following beer brands (particularly Bass and Guinness) that advertised their brands as available.

10. The port trade, this integration suggests, shows aspects of the modern chain as if in a film run backward. The modern global supply chain described in this book is the result of shift from large, hierarchically ordered supply to a disaggregated model. The port trade was actually moving in the other direction. It began disaggregated, but as different players came to dominate their particular supply chain, integration followed. The Oporto exporters, in particular, integrated backward into production and forward into imports, and for some, retail. Similarly, well-branded retailers integrated backward into both imports and production. And some producers even integrated forward.

11. The most powerful brand in the digital world, Microsoft, has almost always been a technological follower. It has, however, both managed its brand and squeezed its upstream and downstream supply chain with innovative ferocity.

12. Those who propound the annihilation of space and time (Gilder 2000; Cairncross 1997) need to explain how businesses will make money.

13. Several Oporto bill-brokering merchants crucially helped the Rothschild brothers service their continental loans during the Napoleonic and later wars.