Chapter 12: Changing Organization of Markets and Payments

"In the pre-Internet dark ages, most economists accepted that, outside their textbooks, they were unlikely to encounter a perfect market. But they did at least know what it would look like."

"How to be Perfect", *The Economist,* February 12, 2000, www.economist.com/archive.

Prologue

The *Economist* article goes on to describe the perfect textbook market:

> It would allow all buyers and sellers to meet together, with full information about supply and demand. There would be no barriers to entering or leaving the market. And every buyer would be matched with the supplier that could best meet his needs. Prices would be exactly the level that would keep supply and demand in equilibrium. And there would be no "transaction costs", such as time wasted seeking the right product.

Can electronic markets achieve this kind of ideal? Online marketplaces can certainly reduce transaction costs. According to academics Steven Kaplan and Mohanbir Sawhney, they can do this in two ways: by aggregating buyers and sellers, thereby reducing transaction costs of going from one place to another; and by achieving better matching of buyers and sellers within a marketplace, thereby creating more value through the exchange process.

Another academic, Paul Milgrom, points out the limits to perfection in markets. Products and services are very often differentiated (as we discuss in the next chapter). This alone makes perfect competition, based on price alone, impossible. What is even more important, perhaps, is the economies of scale that are inherent in information products. These create barriers to entry, and limit the number of competitors. Finally, information is never perfect, even on the Internet. There are large quantities of information available, but it may not be reliable, or in easily usable forms.

Still, the possibilities for increased efficiency clearly are there. The success of eBay (which actually makes a profit) illustrates the potential. The scramble to do the same for business-to-business transactions indicates expectations of further gains. Perhaps the best examples of electronic markets that function quite efficiently are markets for all kinds of financial assets, which we examined in Chapter 7. What lessons do financial markets hold for the organization of other electronic markets? How are financial markets themselves changing? Under what conditions will efficiency increase, and who will capture the extra value created?

Time to read on.

12.1 Introduction

How does e-commerce change the organization of markets? Do they become more competitive and, if so, how? In Section 12.2, we examine the evidence from B2C, or retail, online markets. These markets have the advantage of being able to provide data from multiple sellers for products that are identical, in particular, specific books and CDs. It turns out that the evidence so far is mixed. Prices do appear to be, on average, lower online, which is consistent with greater competition. Prices are also adjusted more frequently and flexibly, which is also consistent with competitiveness. On the other hand, the price sensitivity of online buyers is not clearly greater than in traditional situations, despite the lower costs of search and switching. Furthermore, price dispersion on the Web remains as substantial as in the brick-and-mortar world. One explanation may be the continued importance of trust and reputation on the Web.

In Section 12.3, we consider the mechanics of online auctions. The ability to conduct auctions at low cost on the Internet represents a significant departure from haggling or posted prices that have applied in many such cases. The Internet also enables better matching of sellers with unique or specific items and buyers who want them. Thus the size of the market is increased, as well as its efficiency. Several auction forms are possible, and one of the advantages of Web-based auctions is that rules and processes can be made transparent and clear. Innovations in online auctions are likely to keep occurring.

In the case of B2B transactions, the stakes from improving efficiency are high. We consider B2B markets in Section 12.4. The nature of the products and services traded by businesses – whether they are industry-specific or not, and whether they require relationship-based contracting or not – determine how B2B markets are likely to be organized. Variants of auction formats are likely to be increasingly important, especially as innovations are enabling quite complex requirements to be requested and proposals to be offered. Techniques for incorporating a wide range of product and service characteristics in an automated transaction process are likely to be very important in B2B markets where products are rarely exactly identical across sellers. Such developments may also spread to B2C markets to make so-called “reverse auctions” more sensitive to buyer preferences, and therefore more efficient.

Price dispersion and product differentiation are not the central concerns in financial markets. Financial markets are widely and accurately viewed as the most efficient of markets, the closest to “perfect” that is possible. Yet even financial markets have been subject to costs of reaching agreement and completing transactions. Electronic communications and information processing have steadily reduced frictions in financial markets, and online financial trading has accelerated this process. Equally, if not more importantly, online finance has increased competition in areas where it was previously restricted, at different portions of the financial services value chain, where brokers and dealers captured value partly as a result of their toll-taking positions. Financial Electronic Communication Networks increase competition directly, and by increasing the amount of information that is generally available. Their operation is discussed in Section 12.5.

Section 12.6 considers the payment side of markets. The ability to make payments online is important in the functioning of electronic markets. Online payments are particularly important in consumer markets, since business electronic payment networks are more established. We will consider some aspects of online payments and financial management further in Chapter 20.

12.2 Competition in E-commerce

Competition has many dimensions, but the one that matters in the final analysis is price. If, in comparing across different sellers, everything else about a product or service is identical, it is logical to select the one with the lowest price. In practice, "everything else identical" is an enormous "if", even in e-commerce. However, it is useful to begin considering competition in e-commerce by considering prices.

The prediction of the perfect textbook market is that prices for identical products will be identical, that they will reflect the marginal costs of sellers, and that sellers will make no economic profits in the long run. These predictions were reviewed in Chapter 4. Recall that zero economic profits imply positive accounting profits, since the 'normal' rate of return on capital used in an industry is included in accounting profits, but subtracted as a cost before economic profits are calculated. The industry characteristics that drive these predictions include the existence of many sellers, so that no seller has the power to influence price, and free entry and exit into the industry, so that positive economic profits can not persist, but are instead competed away.[1] An assumption that also matters for the "perfect market", but that gets less prominence in introductory textbooks, is the absence of costs of finding mutually beneficial transactions, comparing across possibilities, and completing the transaction (Sections 4.3 and 6.3, and Chapter 7).

It is not necessarily the case that small departures from "perfection" in market structures lead to correspondingly small departures from the perfectly competitive outcome. For example, it is possible to construct a situation where small buyer search costs lead to sellers being able to charge monopoly prices, even if there are many sellers. In general, though, the link between departures from competitive structures and departures from competitive outcomes is a reasonable one to assume. For example, consider the case of two sellers of an identical product, who independently choose how much to produce and sell, at whatever price their total output will permit. This example was discussed in Section 4.3, and illustrated in Figure 4.11. The market price in this case exceeds the sellers' marginal costs (recall that $P > MR = MC$ for profit-maximizing firms with market power: Figure 4.7 or 4.10a). However, as the number of firms engaged in this kind of strategic competition increases, the market price falls toward marginal cost, and firms' economic profits fall toward zero.

[1] However, in the model of strategic behavior that was discussed in Section 4.2, even two firms that compete on price will end up pricing at marginal cost, with zero profit, *if* they produce identical products *and* have no capacity constraints.

The second example, where greater competitiveness defines our approach to evaluating electronic markets. Our general proposition is therefore the following:

> **E-commerce makes markets more competitive in structure, and this makes the outcomes in electronic markets more competitive.**

Thus, even though electronic markets may not be "perfect", they ought to be closer to perfection, and this should show up in their actual functioning.

In practice, evaluating the general proposition is difficult. Products and services can be very heterogeneous. Shopping experiences on the Internet involve different bundles of the product or service with information and convenience (time savings), as discussed in Chapters 9 and 10. Data on business-to-business transactions is typically not public. Electronic markets are evolving rapidly. All these factors, plus others, make clear comparisons of competition in online and traditional markets difficult to achieve.

The most promising area for comparisons of electronic and traditional markets is in retail (business-to-consumer) markets. There are typically many sellers offering identical products, both in bricks-and-mortar retailing, and in online e-tailing. Prices are posted by sellers, so accurate price data can be collected. Numerous studies have in fact already been conducted in this area. The studies focus on comparing price behavior in online and traditional markets. Recall that the other dimension of prediction with respect to competitiveness is the level of economic profits. On the basis of the huge losses racked up by many, perhaps most e-tailers, one might be tempted to conclude that e-tailing is much more competitive than its bricks-and-mortar counterpart! However, the large, rapid technology and marketing investments being made by e-tailers make this a somewhat unfair comparison. Thus it is better to focus on price behavior. Ultimately, it is the lower prices that come from more competition that in turn drive economic profits down.

For our discussion of competition in e-commerce, we draw on the survey by Michael Smith, Joseph Bailey, and Erik Brynjolfsson. These three academic economists have themselves performed some of the studies that try to quantify the impacts of online markets on prices. The authors go beyond looking only at price levels, to examine four dimensions of price competition in Internet markets:

1. **Price Levels:** Are posted prices lower on the Web?

2. **Price Dispersion:** Are prices of online sellers less spread out?

3. **Price Adjustment:** Do sellers adjust posted prices more finely or frequently on the Web?

4. **Price Sensitivity:** Are buyers more responsive to price changes on the Web?

The economic reasoning for each of these four aspects of price behavior is related to the basic model of competition, though more closely for price levels and sensitivity. We review the economic arguments as well as the evidence.

Price Levels Lower buyer search costs will make it easier for buyers to find low prices, giving sellers a greater incentive to steal business by cutting prices. Lower entry costs in e-commerce also increase price competition, either by increasing the number of firms competing, or because lower prices are required to prevent entry. Operating online may also reduce seller costs, but that provides a separate reason for lower prices, independent of greater competition (lower costs reduce prices, even with perfect competition).

Brynjolfsson and Smith (1999) conducted a study of prices for books and music CDs sold over the Web, and through bricks-and-mortar channels, in 1998 and 1999. While earlier studies had found higher prices online, Brynjolfsson and Smith found that prices were lower on the Web. Their results were quite robust, standing up to variations in methodology and measurement, including how sales taxes and shopping costs (shipping and handling, time), were incorporated into the comparisons. The average price difference was 9% to 16%, depending on the precise comparison made.

Why were earlier results different? In the case of a 1997 study of used car prices, the cars sold online were probably newer and of higher quality. In Bailey's earlier study of prices of books, CDs and software in 1996, 1997, the explanation may be that the market was still very immature. Early online buyers were probably higher income households, and early adopters, with higher willingness to pay – the 'new consumers' characterized by the Institute for the Future (Chapter 6, Prologue). Furthermore, there were fewer sellers operating initially in online markets. Both these factors may have permitted higher prices than now exist.

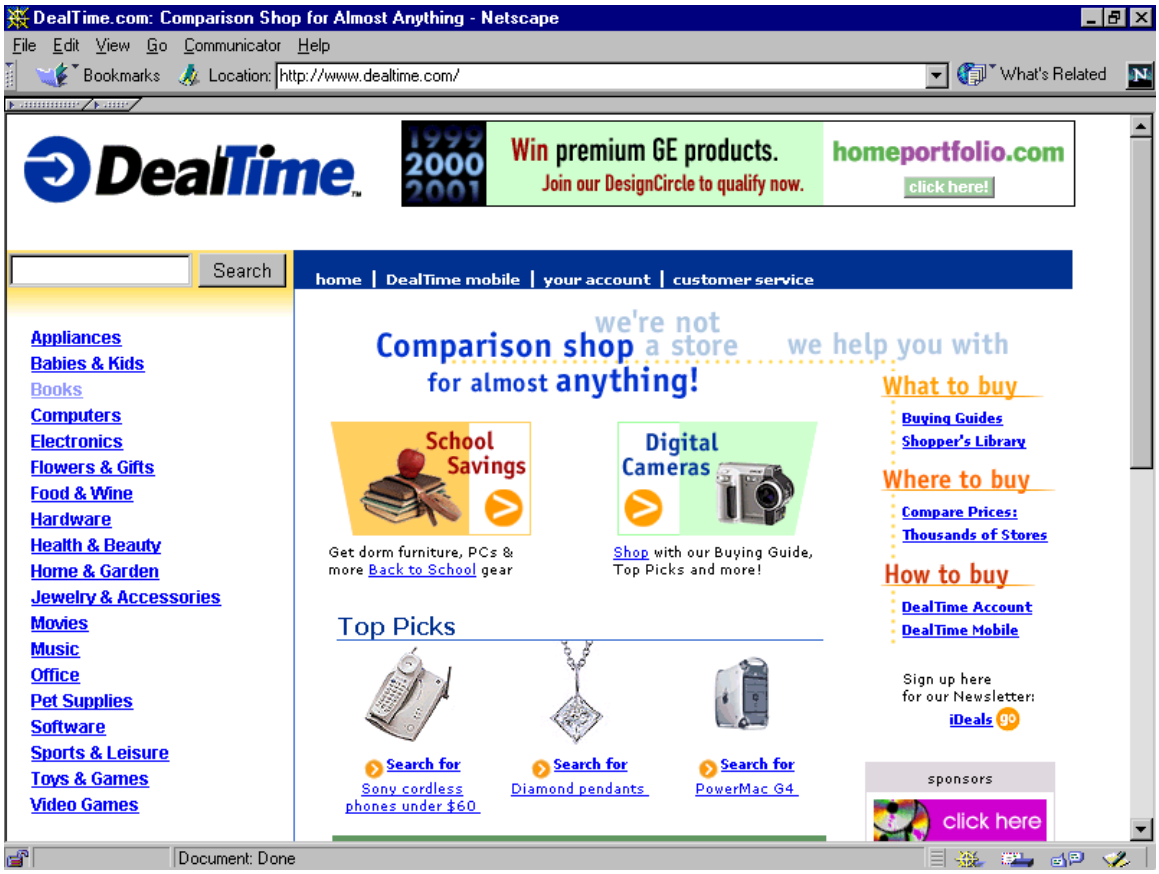
The Brynjolfsson and Smith study suggests that one of the most common assumptions about e-commerce has some truth: online markets are more competitive, in the sense that they have lower prices. Whether this result will generalize across products and over time will require further study. Fortunately, the main characteristic of the Internet, that large quantities of information are easily available, also makes further research quite feasible. We may note that the lower price result would bode ill for companies such as Amazon.com, unless it can realize substantial cost savings that competitors can not match. Recall the quote from Brett Trueman, accounting professor at UC Berkeley (Chapter 4, Prologue): "If it is the case that Amazon's model is better [than traditional retailing], it will get so much competition that margins will be forced down. If it is not so good, then it will not have competition, but it will not make much money."

Price Dispersion If a product is perfectly homogeneous, then all sellers should charge the same price if there is perfect information. In the traditional world of shopping, information is costly to acquire (Chapters 4 and 6), so price dispersion for identical products is a typical finding. The premise for e-commerce, however, is that information is so easy to acquire on the Internet that competition should eliminate or reduce price dispersion. For example, DealTime is just one of a number of price comparison services on the Internet. Figure 12.1 shows the home page for this firm, with a varied list of products for which it offers price comparisons. Figure 12.2 shows the DealTime price

comparisons for two books together: Shapiro and Varian's *Information Rules*, and Choi, Stahl and Whinston's *The Economics of Electronic Commerce*.

The screenshot in Figure 12.2 shows only the first few results of the search. In fact, 59 offers were generated, including from bookstores in other countries. The search results provide all the information one needs to make comparisons, including retail price, taxes, and delivery costs. The search took 40 seconds, not a significant cost. Clicking on the price at the left of Figure 12.2 in the original screen (not in this print book, unfortunately) would take the browser to the online seller's Web site, with the books already identified for purchase. Buyer search costs are not zero, but they are remarkably low. Surely total prices paid by buyers should be the same across sellers, once one controls for differences in delivery time.

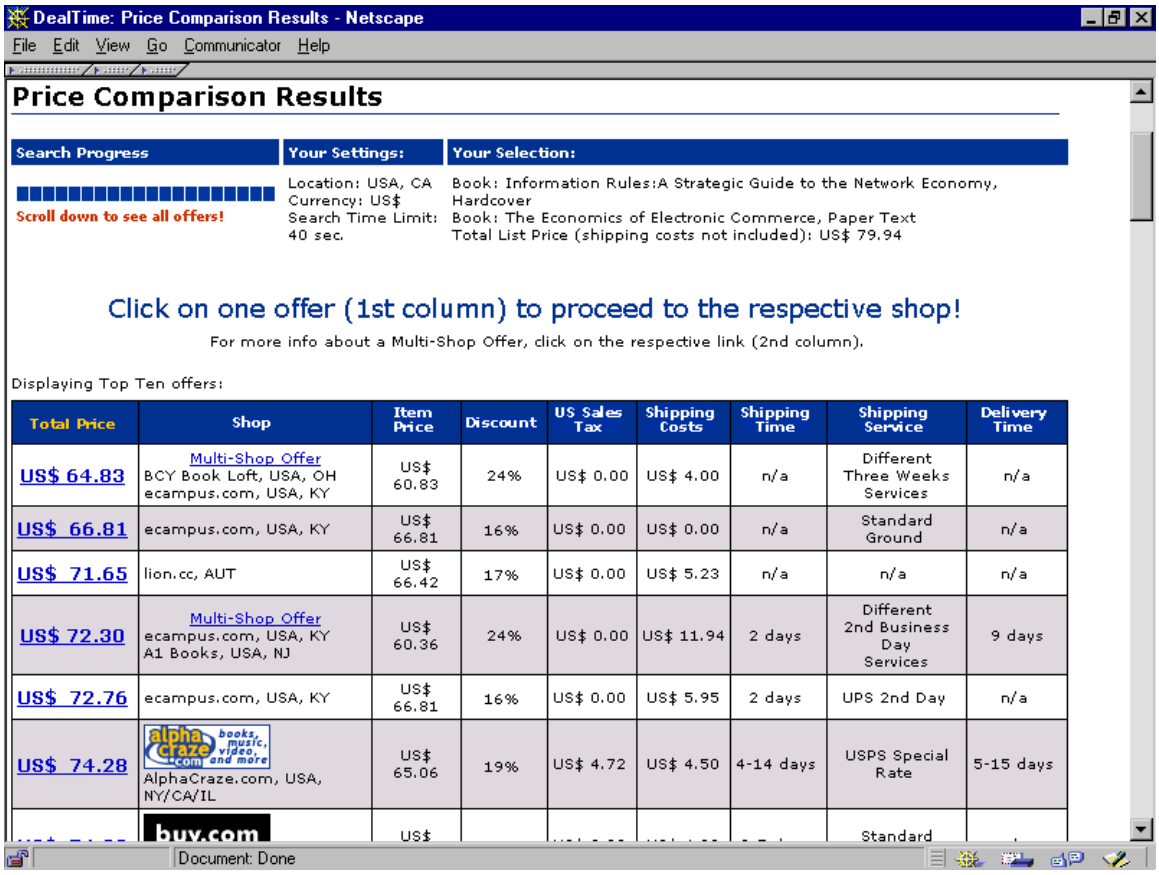
Figure 12.1: DealTime Price Comparison Service



Instead, however one looks at the results, there is substantial price dispersion. Why does anyone pay a higher price than is necessary? Before answering this question, we should note that the example we have given in Figure 12.2 is very robust. The studies by Brynjolfsson and Smith and by Bailey, and a study of airline tickets purchased from

online travel agents by Clemons, Hann and Hitt (1998) all find substantial and persistent price dispersion. Furthermore, Brynjolfsson and Smith explicitly compare online and bricks-and-mortar price dispersion, and find that there is only weak evidence for lower price dispersion in e-commerce. None of these results on dispersion fit with the idea that substantially lower buyer search costs should increase competition and reduce price dispersion.

Figure 12.2: DealTime Price Comparison Results



Brynjolfsson and Smith are careful to show that observable service features do not explain the observed price differences. In fact, they are sometimes negatively correlated with prices, just the opposite of what one would expect. However, less tangible characteristics such as trust, brand reputation and awareness (and lack of awareness of comparison sites) may certainly matter. That is certainly what e-tailers like Amazon (which are not necessarily the lowest-priced sellers on the Internet) are betting on.

Furthermore, firms like Amazon offer an array of information and services that, while they are not tightly linked to individual products such as specific books, raise the costs of switching and searching. A buyer may therefore prefer to go straight to Amazon's site every time. Familiarity with a particular "look-and-feel", and selection

processes may create psychological switching costs that further allow price dispersion. Loyalty programs reinforce this lock-in with tangible rewards for not switching based on price alone (Chapter 16). E-tailers may even use price dispersion to price discriminate, as we discuss in Chapter 14. Finally, while the studies we have discussed focus on identical products, many price comparisons are made across differentiated products (Chapter 13), and price is only one dimension for determining which seller to buy from.

Price Adjustment The evidence on price adjustment is more directly in keeping with the proposition that online commerce is more competitive. In the perfect market, sellers can adjust their prices instantly and costlessly. In traditional commerce, physically changing posted prices is costly, and is typically not done below a threshold size and frequency. One would expect price changes on the Internet to be smaller and more frequent, because the costs of price adjustments on a Web site are much lower than in a storeshelf setting. Indeed, there is evidence for these conclusions. Bailey (1998) found that e-tailers made significantly more frequent price changes than traditional retailers (for the same products). Brynjolfsson and Smith found that online retailers made price changes that were up to 100 times smaller than those made by bricks-and-mortar sellers.

Can one reconcile the findings of more frequent and smaller online price changes with the result that dispersion is no lower on the Internet than in traditional retailing? For example, two close competitors may be quick to match each other's price changes online, reducing dispersion while being quicker to adjust. However, while price stickiness might be seen as supporting dispersion in this case, the two aspects of pricing are really about two different types of behavior. For example, there might be a high-priced seller with an trusted brand, and a low-priced upstart. In the bricks-and-mortar world, they might change their prices infrequently, while if they operate online, they make small adjustments frequently. This different price adjustment behavior has a negligible impact on the basic dispersion of prices.

Price Sensitivity If products are homogeneous, then buyers should be sensitive to price changes. Any seller that undercuts competitors, no matter by how little, should be able to capture a substantial share of customers from those competitors. If online information is better, and buyers can more easily switch among sellers, then buyer price sensitivity should be higher online, leading to fiercer price competition.

The evidence on price sensitivity is mixed. Austin Goolsbee found that consumers who live in high sales tax states in the US were more likely to purchase online, thus avoiding sales taxes. Another study used a simulated electronic market for wine, and found that consumers tended to be price-sensitive when there was little other information available on the product characteristics. More information on those characteristics tended to reduce price sensitivity. A third study found that online grocery shoppers were less price sensitive than traditional grocery buyers. This last result is consistent with Bailey's earlier results on online book and CD prices. Online grocery shoppers are still likely to be individuals for whom time costs are high, and grocery shopping online bundles the physical products with the time services (Chapter 9). Even if delivery is "free", the consumer pays for the product-service bundle.

The conclusion of our survey is that price competition shows some signs of being more vigorous on the Web, as one would expect. On the other hand, sellers have enough strategic weapons so that simple head-to-head price competition can be blunted (Chapters 13 through 17). Even though search costs are much lower online, they are not zero. Huge quantities of information are available, but that information must still be filtered and evaluated. The road to efficiency and perfection is open, but it will be a long road to travel, and there is probably no definite end to the process.

12.3 Online Auctions

Our discussion of competition in the last section has been in the context of B2C posted price markets. These are the most familiar ones, and those where data has been gathered and analyzed in depth. Auction markets have always existed for B2C and B2B transactions, and electronic versions have merely greatly expanded their scope. In the case of C2C transactions, auction markets have been restricted to high-value items such as art objects. These auctions were conducted by firms such as Christie's and Sotheby's, which collected quite high fees for conducting the auctions. The dramatic reduction in the costs of conducting auctions is nowhere more apparent than in the case of C2C auctions for all kinds of items, including collectibles, but also any number of products and services offered for sale by individual households.

The pioneer of online auctions is, of course, eBay. You may know that eBay arose out of Pierre Omidyar's desire to help along his girlfriend's collection of Pez dispensers. Like Amazon.com, eBay is one of the pioneers of e-commerce, and one of its best-known brands. eBay is now a public company with a market capitalization of over $16 billion. Unlike Amazon, it is profitable: in 1999, eBay had a net income of about $11 million on revenue of about $224 million. Those numbers are growing rapidly, but, despite eBay's reputation and status as the largest online auctioneer, they are still quite small. Just for comparison, Ralston Purina sold $4.7 billion worth of dog food, cat food, and kitty litter in 1999. Its net income was $505 million, and its market capitalization was $6.9 billion.

What markets does eBay replace? In some cases, eBay's auctions substitute for flea markets and garage sales. They may even substitute for giving items away. Prices may be posted in such markets, but they are typically determined by haggling (Chapter 7). For higher-value items such as collectibles, eBay competes with newspaper and magazine advertising to announce items for sale (with posted prices and/or haggling determining the price), and with dealers with bricks-and-mortar stores. Such dealers may themselves participate in auctions, but their spreads must on average be reduced by the greater ability of buyers and sellers to interact and transact directly.

As eBay has become established, it has also attracted a significant amount of businesses as sellers, whether to other businesses (B2B), or to consumers (B2C). However, B2B transactions are typically not those that would take place between large businesses. All kinds of businesses, including online and bricks-and-mortar sellers, now list on eBay.

One of the attractions of online auction sites like eBay is simply the huge variety of items available. There is a consumption value to being able to browse through this giant online bazaar, now much more than simply an electronic flea market. We discuss the mechanics of online auctions, their properties in terms of economic efficiency, and the business strategies that drive them. We use eBay to illustrate, but all general purpose online auction sites, such as Yahoo! and Amazon.com's auctions, are similar. We close the section by discussing other variants on online auctions: those of Priceline.com and OneDayFree.

Auction Mechanics Potential buyers may browse or bid for free. Payments to sellers will depend on the option the seller chooses. Sellers are charged two basic types of fees. There is an insertion or listing fee, which usually ranges from 25 cents and $2.00, depending on the opening bid specified by the seller. This opening bid can be lower than the minimum the seller will accept (a reservation or reserve price). If the seller specifies a reserve price, there is an additional fee payable if the item does not sell. Thus the reserve price auction fee is a conditional supplement to the insertion fee. Second, there is a commission payable to eBay at the end of a successful auction, generally ranging from 1.25% to 5% of the sale price. Additional fees also apply if a seller decides to choose listing options such as bold font or featured placement.

The typical auction, to which the above fees refer, is an ascending auction. The opening bid is the lowest possible bid, and bids become higher as the auction proceeds. Bid increments are related to the current highest bid, ranging from 5 cents for bids under a dollar, to $100 for bids of $5000 and over. The auction has a fixed end date. The highest bid when the auction is over wins the item – in fact is obligated to purchase, except under special circumstances. An exception is when the seller has specified a reserve price, and where the highest bid is below the seller's reserve price. If an item does not sell, a seller can relist once without paying the insertion fee a second time.

An alternative to the usual ascending price auction is the Dutch auction, so-named because of its use in auction tulip bulbs in The Netherlands. Here eBay's use of the term is different from its common use by economists. When economists refer to a Dutch auction, they mean a descending price auction. The seller announces a price, and reduces the price over time, until someone steps in with a bid, and buys. With a Dutch auction for a single item, there is only one bid, the successful one! Under some special conditions, the Dutch auction and the usual ascending auction (also known as an English auction) give the same outcome in terms of selling price, but this is not true in general.

Dutch descending auctions can also be used for auctioning multiple identical items. The first bidder specifies a price and how many units he or she will purchase. If this leaves some units unsold, the auction continues. In all Dutch auctions so specified, the seller periodically reduces the price. However, this format is not suitable for eBay's online auctions, and eBay uses the term "Dutch auction" for a particular multi-unit ascending auction. eBay's Dutch auction is described in the Illustration Box below.

The proxy bidding in the Illustration Box refers to automatic bidding by eBay on the buyer's behalf. The buyer can specify a maximum price, and not have to monitor or bid thereafter. The automation of this and various other facets of the auction process is a major source of efficiency, and this is one of the factors that permits online auctions to flourish. Another interesting feature of the eBay Dutch auction is that high bidders get priority, but they pay a lower price, if the marginal unit is bid lower. This is a characteristic of what is referred to as a second-price auction, in the context of auctioning a single item: the winning bidder pays the second-highest bid rather than his or her own highest bid.

Illustration Box
eBay's Dutch Auction

This auction format is perfect for sellers with many identical items to sell! In order to use this auction format, sellers must

1) Have a Feedback Rating of 10 or above and

2) Be a member of eBay for 60 days or more.

- Sellers start by listing a minimum price, or starting bid for one item, and the number of items for sale.
- Bidders specify both a bid price and the quantity they want to buy.
- All winning bidders pay the same price per item—which is the lowest successful bid. This might be less than what you bid!
- If there are more buyers than items, the earliest successful bids get the goods.
- Higher bidders are more likely to get the quantities they've asked for.
- Proxy bidding is not used in Dutch Auctions.
- Bidders can refuse partial quantities. For example, if you place a bid for 10 items and only 8 are available after the auction, you don't have to buy any of them.
- The only exception to the requirement that all items be identical relates to trading card listings. Lots of trading cards need not be identical due to the nature of these sales in the trading card arena.

Source: www.ebay.com

Other features of online auctions include initial checks on sellers, dynamic reputation building through buyer feedback on repeat sellers, integrated payments online and escrow arrangements for high-value items. Fraud and misrepresentation, as well as attempts to manipulate bidding, certainly continue in online auctions, but some element of these behaviors is present in any economic interaction. Online auctioneers have continued to evolve methods to minimize such problems, and their harmful effects.

Economic Properties The Internet allows potential buyers and sellers to find each other or meet more efficiently. Why are auctions a good way to conduct the price agreement that follows the meeting? When buyers and sellers do not know each other's valuations

of the product that might be transacted, there is the possibility that they may fail to complete a transaction that would actually be mutually beneficial. This problem is very close, in an abstract way, to the lemons problem that we discussed in Chapter 7. Auctions are a good institution, on average, for making sure that the value that can be created by mutually beneficial transactions is realized.

Auctions are more flexible than posted prices, but less subject to uncertainties than free-form haggling. While auctions may not always guarantee the efficient outcome (particularly where multiple units of a product are being offered), they generally do well in terms of value creation. They tend to favor the seller in terms of value capture, particularly when there are many potential buyers and a single seller. Where there are multiple sellers, this value capture feature of auctions is attenuated. Posted prices become relatively more attractive in that case.

Figure 12.3a: A Match

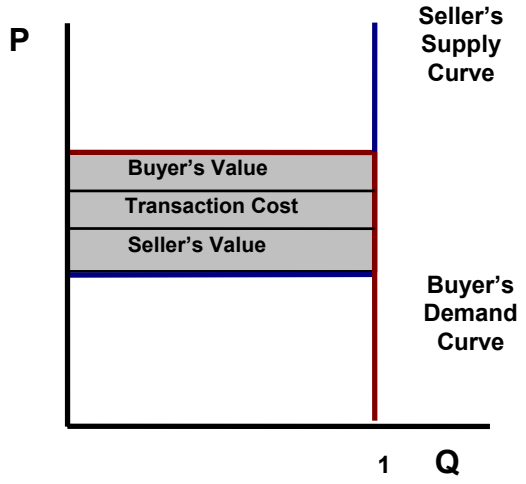
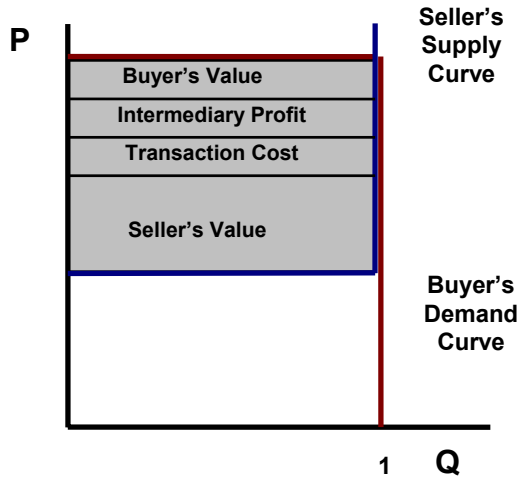


Figure 12.3b: A Better Match



The value capture aspect of auctions is less important than their value creation role. On eBay, thousands of transactions are presumably completed, in which the seller receives a higher price than he or she otherwise would. However, if the item is sold to a buyer who does not value it very much more than the seller, little extra value is created by the transaction (see Figure 12.3). An online auction not only brings together potential buyers and sellers, but also tends to bring about high-value matches. This is the value of online exchange. Any reduction in transaction costs further supports this gain in efficiency. In Figure 12.3a, we assume that there is no intermediary, and that the transaction cost includes costs of searching and of completing the transaction. These costs may be borne by the seller or the buyer, but ultimately are a loss to both of them. In Figure 12.3b, we assume that the higher-value match is brought about by an intermediary, so the intermediary's accounting profit (return for making the better match possible) is also shown. The transaction costs may still be partially borne by the buyer and seller. The intermediary's fees include its share of the transaction costs, as well as its

profit. In the Figures, the high-value buyer on the right-hand side captures no more value than the low-value buyer on the left-hand side, but the seller and the auction intermediary both benefit from the better match.

Online Auction Strategies While eBay was the first online auctioneer, there are now many competitors. eBay remains the largest auction site, and, unlike Yahoo! and Amazon, it specializes in auctions. We have discussed in Chapters 9 and 10 how firms like Yahoo! and Amazon are bundlers of content and services, as well as direct or indirect e-tailers. We will discuss this bundling strategy further in Chapter 13. In this context, providing auction services is only part of a broader strategy.

For eBay, its competitive advantage must rest squarely on its ability to provide something in the area of auction services that competitors can not provide. Since most features of digital products and services are easily replicable (though patents are used to try to protect software-based business methods from imitation – see Chapters 3 and 17), one of eBay's main sources of advantage is simply its size. Why does size matter? If buyers are more likely to find what they are looking for on eBay's larger network of sellers, then they will focus their search and bidding efforts on eBay. If sellers are more likely to attract the highest value buyers on eBay, they will prefer to list there. Hence expectations and initial success in building an online auction business are self-reinforcing, giving the large first mover a permanent advantage. This is an example of network externalities, which are discussed in general in Chapter 16.

There are several caveats to this argument. First buyers can search and bid on more than one auction site. Sellers can list the same item on more than one site, but they must monitor carefully to avoid the risk of being obligated to sell the same item to two successful bidders. If the item sells on one site, it can be withdrawn from the other site. In any case, buyer crossover is the main check on an auction site's power. Buyers must still bear higher time costs if they visit multiple sites. Not surprisingly, intermediaries arose that would search across online auction sites, much as price comparison intermediaries search across different posted-price sellers (see the previous section). While the smaller auction sites had no problem with these intermediaries, eBay has vigorously and somewhat successfully fought legal battles to prevent such searches gathering information from eBay's site. This illustrates how important a large closed network is to eBay.

Other Auction Types Priceline.com became famous for offering what it called "reverse auctions", where the buyer named the price that he or she was willing to pay for airline tickets. This is an auction in the sense that sellers bid to fulfill the buyer's demand. However, as soon as Priceline finds a bid that meets the buyer's price, it fulfills the order. This is different from a typical business procurement contract, for example, where sellers submit simultaneous bids to the buyer, who then chooses on the basis of announced criteria, which may be just low price, but may also include other characteristics. In the Priceline.com model, the buyer can specify only a limited number of characteristics (see the Illustration Box for the case of airline tickets).

Priceline.com has expanded its "name your own price" model to a range of products and services in addition to airline tickets: hotel rooms, rental cars, mortgages, mortgage refinancing, long distance calling time, home equity loans, new cars, mortgage pre-approvals, groceries, miscellaneous new and used goods, and even gasoline. The firm plans to add cruises, travel packages, and other options to this menu of offerings.

Illustration Box
Buying Airline Tickets on Priceline.com

Here is how Priceline describes its offering:

Whether you're flying in a few months or a few days, domestically or internationally, Priceline.com is a great way to SAVE money on leisure airline tickets. You'll always get tickets on the 8 major U.S. and top international airlines, and most flights are non-stop or one stop!

Making an airline ticket request is easy. Just tell us:

- Your travel dates.
- The cities you're traveling between.
- How much you want to pay per ticket (excluding standard taxes and fees).

We'll let you know in one hour or less whether your price was accepted. If so, we'll immediately charge your ticket(s) to the credit card you provide.

Things you should know about priceline airline tickets:

- All tickets are round-trip.
- You may receive flights that leave ANYTIME between 6 am and 10 PM on your travel dates.
- Flights are assigned by the airlines and can not be changed.
- Priceline airline tickets cannot be canceled, refunded or transferred to another person.

Source: www.priceline.com

Priceline.com had a net loss of about $1 billion in 1999 (though this included some special one-time items), on sales of $482 million. The year 2000 is turning out better, with a net loss of $4.5 million on revenues of $352 million in the quarter ending June, 2000. While Priceline has moved into competing with eBay, offering seller listings as well for miscellaneous items, its main business remains in other areas. In the travel arena, its limitations in terms of buyer flexibility suggest that it will have to evolve its offerings. For now, it relies on partnering with more conventional online travel agent Travelocity.com for fulfilling need the needs of travelers who have more specific requirements than Priceline offers.

Thus Priceline is limited in two ways: the process that governs price agreement, and the process that that specifies product or service characteristics. The latter aspect is being automated for B2B transactions by firms such as Perfect.com (see next section). An example of a more sophisticated price agreement process, one that has some similarities to eBay's Dutch auction, is the Dynamic Price Calendar Auction™ devised by OneDayFree. This auction format combines ascending and descending price features, as well as features of a posted price market (see Illustration Box). It illustrates how detailed rules can be specified in electronic markets, just on the dimension of pricing.

Illustration Box
An Electronic Calendar Auction

This is how the calendar auction works:

- During a "pre-live period", a seller specifies the nature of the product, the number of units being offered for sale, the initial price, the beginning date, and either a price step size or a final date, at which the price reaches zero.
- Every day after the initial date of the auction, the per-unit price steps down by the specified amount, until the price is zero on the last day. This is like a descending auction.
- Buyers can enter the auction at any time, and immediately purchase all or some of the available units at the current price. This is like a posted price market.
- Buyers can also "order agents" to place advance bids for a later day at that future date's price.
- A near dated advance bid is at a higher price, and so has priority over a far dated bid. This is like an ascending auction.
- All earlier transactions and all advanced bids are publicly listed, giving complete transparency in the process.

Source: An Electronic Calendar Auction, Alessandra Cassar and Daniel Friedman, University of California at Santa Cruz, May 2000.

12.4 Business-to-Business Transactions

While online consumer transactions such as those conducted on Amazon, eBay or Priceline capture the most headlines, B2B transactions dominate online transactions in overall value. The ability to conduct B2B transactions online, with better matching of buyers and sellers, and greater speed, is at the heart of claims that e-commerce will redefine the boundaries of firms (Chapter 5), and change them into loose networks of partners and suppliers (Chapter 11). Here we examine the details of how online B2B transactions work, and how they improve efficiency.

By definition, B2B transactions take place within the overall value chain, but outside the boundaries of firms. They may involve finished products and services that we

would normally think of as consumer goods: paper, airline tickets, computers, and so on. The products may be somewhat different for the two market segments, but they are all "finished" products. In other cases, the products and services are specifically intermediate goods that are only inputs into the production process, and not final products or services for consumers. Steel, plastic, production machinery, industrial chemicals, and numerous other examples exist of such pure B2B products.

Predictions of the volume of B2B transactions that will move on to the Internet are often impressively high, running to the trillions of dollars, but these forecasts sometimes seem to neglect the intermediate nature of the transactions, resulting in double counting. If a firm buys steel from a steel manufacturer for $1 million, and produces nuts and bolts which it sells to a hardware chain for $2 million, the volume of B2B transactions is $3 million, but this double counts the value of the raw steel. As we discussed in Section 5.2, value added is what matters for assessing economic activity at different stages of the value chain. Despite this cautionary note, it is clear that all along the supply chain, or along the value chain prior to the last stages that put products in final consumers' hands, numerous large-value transactions occur, and anything that can make them more efficient will create substantial economic value.

How exactly do non-Internet B2B transactions occur? We must answer this question before we can assess the possibility of increased value creation. We discussed the basics of market organization and economic roles of intermediaries in Chapters 7 and 8. Certainly those concepts apply to B2B markets. Here we focus on the mechanics of transactions. Traditional interactions take place via face-to-face meetings, telephone conversations, and exchanges of faxes and mail (now including email). Members of organizations on both sides of the transaction perform these functions. The goal in each case is to exchange product information, negotiate prices, quantities and other contract terms, place orders, make sure that the orders are fulfilled and payments made, and so on.

Most B2B transactions have typically taken place through such bilateral interactions. Where several possible sellers exist for a buyer, buyers may use competitive bidding by suppliers to fulfill their needs. In other cases, buyers may have relatively long-term relationships with suppliers. Each of these methods has different incentive properties, and may be best suited for particular conditions. There is a great deal of complexity in business relationships and transactions that is reflected in a variety of contractual arrangements. In some cases, as we discussed in Chapter 11, the boundaries of the firm may become blurred or partially altered by the relationships between firms operating at different points along the overall value chain.

One of the major changes in B2B transactions in the last two decades has been the spread of Electronic Data Interchange (EDI). EDI can be viewed as the precursor of the online B2B markets that are now beginning to evolve. EDI can be used internally by firms. For example, Wal-Mart was a pioneer in linking its stores inventory systems with its distribution hubs, allowing it to be efficient in keeping its shelves stocked. Mrs. Fields' Cookies connected its stores to central headquarters, which could monitor overall sales trends and recommend which cookies to bake in which quantities, by the hour.

EDI also connects the internal information systems of different firms, and thus becomes a vehicle for automated B2B transactions. The automation not only reduces the costs of reaching agreements and completing transactions, but also provides benefits in terms of improved efficiency throughout the supply chain: internal and external operations can be coordinated. For example, Wal-Mart went further back in the supply chain than its own distribution hubs, to link electronically with its large suppliers, making its inventory management even more effective. In the sense that EDI provides automation and speed of information flows, it performs some of the functions that Internet trading promises. However, EDI has limitations that the Internet does not.

EDI is based on dedicated point-to-point connections. This makes it costly and difficult to serve small firms, to connect multiple buyers and sellers, or to serve a dynamically changing set of participants. EDI also lacks the flexible and interactive nature of the World Wide Web. Auctions, dynamic pricing and post-transaction information interchange such as problem tracking or customer support are more difficult or even impossible with EDI. While this is not directly relevant for B2B transactions, EDI can not encompass consumers into the same network as the rest of the value chain. The Internet thus offers all the benefits of EDI, plus more, and offers them to a much broader class of B2B transactions.

We can broadly classify the benefits of online B2B transactions in the same terms as in the previous section. Refer again to Figure 12.3. Value is created in two possible ways. First, better matches are created between buyers and sellers on average. Second, the costs of conducting transactions are reduced. In this chapter's prologue, we mentioned the classification of value creation suggested by Kaplan and Sawhney: aggregation and matching. Aggregation is used to refer to the meeting of buyers and sellers in one place, reducing search and other shopping costs. In fact, automated transactions can reduce costs in other ways as well, including the channel suggested by Kaplan and Sawhney.

Classifying B2B Transactions Kaplan and Sawhney provided an influential classification of B2B transactions, distinguishing them along two dimensions. The first dimension involves the industry-specificity of the products or services. Computers, business travel and office supplies are common inputs across industries, they are nonspecific. Machinery and equipment, parts, chemicals, and raw materials are much more industry-specific. The second dimension of the classification refers to the nature of the business relationships underlying the transactions. Businesses may buy inputs on an immediate or short-term basis, mainly on price, or they may use negotiated contracts. We discussed these alternatives earlier in Section 7.5. In brief, long-term contracts may provide better incentives when specifying and directly monitoring quality is difficult. This choice is also related to the nature of the products and services transacted, but in a different way than is industry-specificity.

The two-way classification leads to the following table (Table 12.1), adapted from Kaplan and Sawhney (2000). We use the names coined by those authors, and

discuss them below. They use the term "hub" to denote a marketplace. Non-specific inputs lead almost by definition to "horizontal" markets, which cut across buyers from different industries. Industry-specific inputs require specialized knowledge and products, and lead to "vertical" markets, where "vertical" simply refers to a particular industry or sector. Thus yield managers and MRO hubs operate in horizontal B2B markets, while exchanges and catalog hubs operate in vertical markets.

Table 12.1: Four Types of B2B

Type of input / Type of transaction	Non-specific inputs	Industry-specific inputs
Spot transactions	Yield Managers	Exchanges
Contracts	MRO Hubs	Catalog Hubs

Source: Adapted from Kaplan and Sawhney, *Harvard Business Review*, May 2000.
Note: MRO stands for "maintenance, repair and operating", which is how they characterize non-specific inputs.

Like any other taxonomy, the one in Table 12.1 is not perfect, but it provides a useful starting point. Kaplan and Sawhney suggest products and motivations for each box in the table, justifying the names they use. For example, yield managers are characterized as creating spot markets for common operating resources such as human resources (e.g., Employease), advertising (e.g., Adauction.com), and even electricity (e.g., Youtilities), permitting buyers to expand or contract with flexibility. Online exchanges, on the other hand, provide similar services for industry-specific inputs (e.g., e-Steel, PaperExchange.com, and Altra Energy). MRO hubs and catalog hubs both use catalogs of products, aggregating suppliers across (MRO) or within (catalog) industries. MRO hubs include BizBuyer.com and MRO.com, while catalog hubs include PlasticsNet.com and Ventro (which includes several vertical marketplaces within the firm boundary).

The use of "catalogs" does not imply that posted prices are used in determining transactions, since catalogs do not have to specify prices. In general, whether posted prices, haggling, or auctions are used will depend on a variety of factors, including perishability, the degree of fluctuation in needs and availability, and the complexity and value of individual transactions. As automation takes hold, one would expect variants of electronic auction mechanisms to replace both posted prices and free-form negotiation. As we noted in describing OneDayFree's auction mechanism, auctions can include quite complex rules of price adjustment. Auctions need not be for simple spot transactions, since contracts themselves can be auctioned.

Another useful point to note is that auctions need not be restricted to standardized or near-standard commodity products. Unique items can also be auctioned. Thus the

distinctions drawn by Kaplan and Sawhney between yield managers and exchanges may be overdrawn in some ways. Perhaps a more useful distinction is between one-sided and two-sided auctions. Two-sided auctions are typical of financial markets, and reflect the fact that buyers and sellers do not have fixed positions. In the case of some industrial assets, such as electricity supply contracts, firms may similarly have excess availabilities or needs, and may trade on markets that are more similar to financial markets.

Types of B2B Market Firms An alternative classification of online B2B market players focuses on their position between buyers and sellers. B2B markets may be organized by neutral market makers, buyer consortia or aggregators, or sellers consortia or aggregators. Neutral market makers face the challenge of being attractive to buyers and sellers simultaneously. Significant asymmetries in size or market power between buyers and sellers can make this difficult. On the other hand, if both sides of the market are fragmented, a neutral intermediary may be able to reduce transaction costs and improve the quality of matches significantly. The market for life-sciences equipment and supplies gave Chemdex (now Ventro) this possibility, but it still had to begin by closely partnering with a large catalog supplier, VWR.

Buyer consortia are natural where there are a few large buyers and sellers are more fragmented. The automobile, aerospace and medical industries are examples where oligopolists have been quick to create their own online industry exchanges, pre-empting or competing with neutral market makers. The automobile exchange, Covisint, formed by General Motors, Ford and Daimler Chrysler is the best known of these oligopolistic consortia. One can speculate that such an institution is designed to protect or enhance the market power of the buyers: in other words, the motivation is value capture more than value creation. In other cases, buyer aggregation may be undertaken by genuine intermediaries. Large buyers such as the big automakers are also developing their own private Net marketplaces. Kaplan and Sawhney give the examples of FOB.com, which serves small buyers in the chemicals industry and related sectors, and BizBuyer.com, which aggregates buyers in horizontal markets.

Seller consortia consolidate in the direction of the value chain flow, aggregating across suppliers and then auctioning or otherwise selling these products. Large suppliers may also dominate such markets. For example, the airlines have moved toward creating a consortium to sell airline tickets online. While this is partly geared toward consumers, business air travel is the airlines' major source of profits, so we can view this as part of a B2B strategy as well.

B2B Platform Providers Underlying the market makers and the exchanges are firms that provide the technology to make online B2B markets actually work. Well-known firms in this area, such as Ariba and CommerceOne, began by developing software for online procurement for use on large clients' intranets. i2 Technologies and IBM (which both partner with Ariba) are other major players in providing software for B2B markets. For example, i2 Technologies has struck deals with DaimlerChrysler, Toyota and Volkswagen to help develop those automakers' private Net marketplaces. i2 is also working with Oracle and Commerce One on Covisint, the automotive Internet exchange

being formed by DaimlerChrysler, Ford Motor, General Motors, Renault and Nissan Motor.

Ariba has joined with IBM and Microsoft to develop a directory for online B2B markets, based on the XML standard for data exchange on the Web. Called Universal Description Discovery and Integration (UDDI), this will act like a giant online business Yellow pages, allowing businesses to describe the type of services they offer and those services to be located by other businesses.

Table 12.2 summarizes some of the functions provided by leading Net market platform providers, as rated by Morgan Stanley Dean Witter Internet Research. SAP is an Enterprise Resource Planning (ERP) firm that is attempting the transition to Internet and e-business software. Oracle is the world's second largest software company, and the dominant supplier of database software. The others in the table are pure B2B players. The table details some of the features that B2B software might be expected to have, and came from the Web site of another B2B software provider, which just happens to fill the empty highlighted line (RFP: requests for proposals).

Table 12.2: B2B Platform Providers

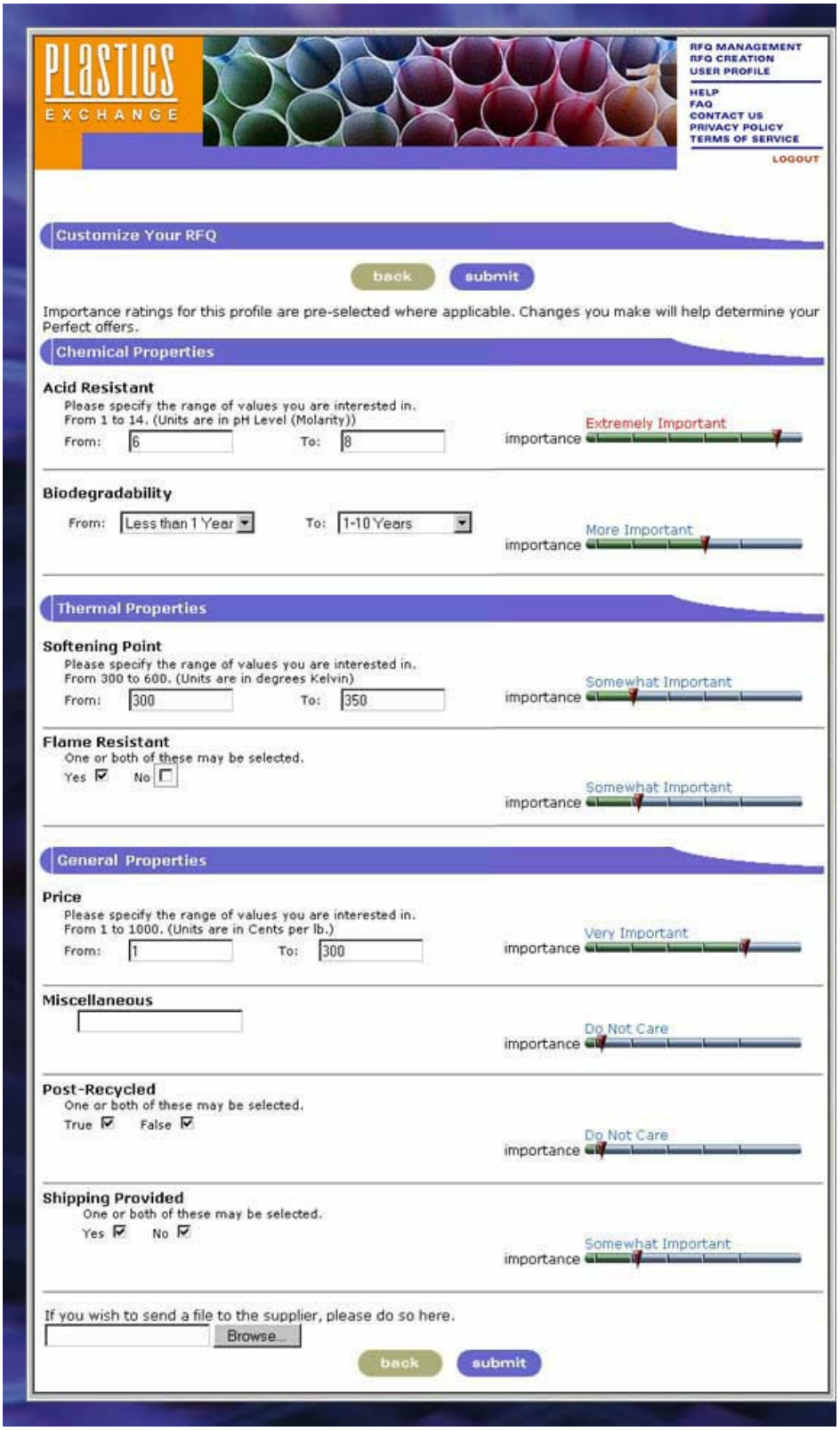
Functionality Report Card	Ariba	Oracle	SAP	C-One	i2 Tech
Real Time Bid/Ask	A	-	-	-	-
Content Management	B	B	C	B+	C
RFP	-	-	-	-	-
Auctioning	B	-	-	B	-
Procurement Window	A	B	C	B	-
Workflow	A	C+	C	C+	-
Integration	B	B	C	A	C
Fulfillment Expertise	-	C	B	-	A
Supply Chain Mgmt	-	C+	C+	-	A
Demand Chain	-	B	-	-	C
Consulting resources	C	A	B	C+	B
Network Platform	B	C	D	A	C
Scalability	B	A	C	C	C

Source: Morgan Stanley Dean Witter Internet Research

Source: www.perfect.com

Perfect.com deals with one of the thorniest problems of automating markets. If price alone is not the deciding factor, then there must be some way of incorporating other features into an online marketplace. With the help of academic Paul Milgrom (who also holds the unusual company title of Chief Economist), Perfect.com has set out to solve the problem. The firm offers a "customizable, automated, multi-dimensional RFQ [request for quote] environment" that permits buyers and sellers to interact in a manner that considers the trade-off between many competitive dimensions, including "quality, delivery, performance, specifications, third party ratings, warranty, and customer service."

Figure 12.4: Specifying Non-Price Characteristics at Perfect.com


PLASTICS
EXCHANGE
RFQ MANAGEMENT
RFQ CREATION
USER PROFILE
HELP
FAQ
CONTACT US
PRIVACY POLICY
TERMS OF SERVICE
LOGOUT
Customize Your RFQ
back
submit
Importance ratings for this profile are pre-selected where applicable. Changes you make will help determine your Perfect offers.
Chemical Properties
Acid Resistant
Please specify the range of values you are interested in.
From 1 to 14. (Units are in pH Level (Molarity))
From: 6
To: 8
importance
Extremely Important
Biodegradability
From: Less than 1 Year
To: 1-10 Years
importance
More Important
Thermal Properties
Softening Point
Please specify the range of values you are interested in.
From 300 to 600. (Units are in degrees Kelvin)
From: 300
To: 350
importance
Somewhat Important
Flame Resistant
One or both of these may be selected.
Yes
No
importance
Somewhat Important
General Properties
Price
Please specify the range of values you are interested in.
From 1 to 1000. (Units are in Cents per lb.)
From: 1
To: 300
importance
Very Important
Miscellaneous
importance
Do Not Care
Post-Recycled
One or both of these may be selected.
True
False
importance
Do Not Care
Shipping Provided
One or both of these may be selected.
Yes
No
importance
Somewhat Important
If you wish to send a file to the supplier, please do so here.
Browse...
back
submit

Participants using Perfect.com's technology can choose varying degrees of automation, and a wide range of auction formats and information exchange. According to Perfect.com, "Our patent-pending methodology for running multivariate reverse auctions represents the backbone of Perfect's solution and is derived from extensive experience in economic theory and its application." A flavor of how different product or service characteristics are integrated can be obtained from Figure 12.4.

Value of Online B2B The newness of the Perfect.com model suggests that there is still a considerable amount of innovation to be squeezed out for B2B marketplaces. While B2B revenue projections may be overblown, even savings of a few percentage points in overall costs can be significant. Estimates of direct savings from moving transactions online range from 10 to 90%, according to the Gartner Group, an Internet research firm.[2] Inaccuracies are also greatly reduced. These are direct transaction cost savings. The Perfect.com approach aims to improve matching dramatically, thereby increasing the value created in exchange. While estimating the potential gains is difficult if not impossible, the success of firms such as Enron (see Illustration Box) indicates that substantial increases in value are possible, simply by moving markets closer to their ideal working.

Illustration Box
Enron Roars Online

Enron is a Houston-based energy firm that used to be best-known for traditional capital-intensive energy generation and gas-pipeline projects. Now the largest share of its profits comes from online trading. The company is the largest trader of gas and electricity in North America. It also has created online markets in unused fiber-optic line capacity, weather derivatives (financial assets or contracts where payments are contingent on factors such as rainfall), and more traditional commodities such as coal and plastics. More than 800 products are traded on EnronOnline, with online transactions valued at over $50 billion in the first half of 2000.

Making an online market in a commodity such as natural gas is not easy. Trading involves fairly complex contracts. Enron serves as the market principal, providing liquidity by serving as buyer or seller as needed. Thus pricing information has to be absolutely accurate and up-to-date. So far, EnronOnline has worked extremely well, and the company expects that all gas trading will soon be done only on the Web.

Sources: "Rebecca Mark's Exit leaves Enron's Azurix Treading Deep Water", Rebecca Smith and Aaron Lucchetti, *Wall Street Journal*, August 28, 2000, p. A1. "Driving Grassroots Growth" Gary Hamel, *Fortune*, September 4, 2000, pp. 180-182.

Who will get the gains? There are now hundreds of online B2B marketplaces, competing fiercely to gain a foothold. Kaplan and Sawhney and many others emphasize

[2] Quoted in Asera white paper, "The Impact of the Internet on Demand Chain Management", 1999, www.asera.com.

the "winner-take all" nature of online markets. As we discussed in the last section, this is because of the network externalities that exist: it is better to be a member of a larger network. However, as we also pointed out in the last section, for that argument to work, the network must be closed. As we shall see in examining online financial markets in the next section, there is not presumption of "winner-take-all", unless it is supported by some barrier to entry. Firms like IBM, Ariba and i2 are partnering in open standards for Web marketplaces. If firms can simultaneously access multiple online marketplaces, there is no reason why many of the new B2B market makers or consolidators should not survive, with none becoming truly dominant. Markets controlled by oligopolistic consortia may dominate, but that would be a consequence of leveraging market power from other markets, not from some "natural" forces leading to dominance. Perhaps, the surest winners are the technology providers with valuable intellectual property: the best recipe for value capture in the knowledge economy.

12.5 Online Financial Markets

Financial markets have used electronic trading for some time now. Decades before the Internet and the Web became global vehicles for information exchange and transactions, financial institutions automated various components of financial transactions, and introduced electronic communications. Companies such as Reuters, which began as a newswire agency, became powerhouses of the financial sector, by providing specialized terminals over which financial services professionals could receive all the information they needed for making trading decisions. This kind of service used a version of EDI. Reuters, Bridge and Bloomberg still provide such information services over dedicated terminals and connections, but the Internet provides an access vehicle for many more market participants than the old model. Thus the transition taking place in online finance partly parallels general B2B developments. In this section, we will focus mainly on trading in existing stocks. We will briefly consider bond trading and stock IPOs later in the section.

One difference in the financial world from general B2B has been the existence of centralized exchanges, such as the New York Stock Exchange (NYSE). The NYSE provides a centralized location for trading stocks, as discussed in Chapter 7. Other exchanges provide similar roles, for stocks or other financial assets. The NASDAQ system serves a similar role, but without some of the institutional features of the NYSE, including a central trading floor. Both NASDAQ and the NYSE perform other functions: firms have to meet certain requirements (beyond those required to become public companies) before they can be listed on either exchange. The institutions also place restrictions on their own members. Thus both organizations play certification and reputational roles, for which they are compensated by member institutions or individuals.

In any case, the shift to online financial markets, with more open access, begins from a situation where there are existing formal market institutions. These institutions have already automated much of their operations, using electronic communications and information processing capabilities. Thus new entrants partially compete with these established bodies. While regulation of online B2B marketplaces will take some time to evolve, there already exists a well-defined regulatory system for financial markets. In

particular, the new online financial market institutions are permitted to link to existing networks: they can not be shut out.

Value Creation The addition of financial market institutions that improve the average information available to market participants will again tend to have two positive effects. It will potentially improve the matches created, increasing the value created in financial transactions, and it will reduce the costs of actually performing the transactions (see Figure 12.3 again). Some of the latter gain has been realized by the automated electronic trade execution, settlement and payment systems that are already in place. However, costs of retail trading remained high, with brokers having to individually take orders, and with much of the retail end of record-keeping still requiring relatively costly and cumbersome paper flows and manual procedures. Online trading capabilities have helped reduce trading costs at the retail end, by automating the process of placing orders, receiving trade confirmations, and so on, for individual investors or traders. The Internet has also expanded tremendously the amount of information available to individuals, from real-time stock quotes, to quite detailed financial research and information on every publicly traded firm. We will discuss this information explosion below, and also in Chapter 20.

Value Capture Better information flows and more efficient transaction processing do not necessarily mean lower costs to those trading stocks in general. The key accompanying change has been the increase in competition throughout the financial services value chain. The removal of restrictions on trading commissions in 1975 helped begin the process of passing on savings in transaction costs to the final buyers and sellers. Discount brokers such as Charles Schwab dramatically reduced stock trading commissions. This process was accelerated by the introduction of online trading for retail investors, which saw the entry of dozens of online brokers, such as E*Trade, Ameritrade, and National Discount Brokers.

Competition among online brokers has pushed commissions down to a fraction even of traditional offline discount brokers, and forced Schwab and even "full service" brokers such as Merrill Lynch to come up with online options for stock trading. Competition also increases the amount and the quality of information that is offered free or at very low cost to general market participants. Thus competition among online brokers has ostensibly We will examine these "front-end" aspect of online financial markets in more detail in Chapter 20. Here we focus on what happens behind the scenes. While low commissions are clearly beneficial, other things equal, it is also important that a buyer or seller get the best price available when orders are executed. Whether this is achieved in practice has not been so easy to ascertain. In particular, online brokers do not themselves perform trades. They send orders to exchanges or networks, were matches are made and orders executed. If there is little competition at this level of the market, then value is again disproportionately captured by the intermediaries at the core of the market: the dealers and specialists that set prices and execute trades. It is here that new competition is taking hold.

Electronic Communication Networks We briefly referred to ECNs in Chapter 7. Here we examine them more closely. ECNs may serve as extenders of the reach of the dealers

and specialists that have traditionally made financial markets function, but they also have the potential to transform and limit their role. ECNs may come close to leveling the playing field for all traders, and reduce the simple toll-taking aspect of financial market dealers and specialists. The ECNs we will discuss are Instinet, Archipelago, and The Island ECN, but there are now many others worldwide.

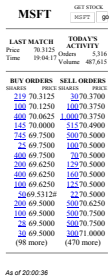
Dealers and specialists carry inventory, and therefore serve a market-smoothing role. However, this service is bundled with a price-setting function, that works something like the following. For example, a NASDAQ dealer quotes prices at which he or she is willing to buy and sell particular stocks. The "spread" between the two prices is the dealer's margin, and the source of profits. The dealer sits at a screen (perhaps a terminal leased from Reuters) and observes a constant stream of new information. This includes general information about financial markets, news and other events. More particularly, it includes a picture of the state of the market in the stocks in which he or she is dealing: the range of offers to buy and sell, their prices and quantities. The dealer's bids and asks will be constantly adjusted to reflect changes in the state of these "order flows". The dealer also sees the prices at which trades are being executed by others, and the quantities of those trades. Information is thus constantly being used by the dealer to modify his or her decisions, in terms of the trades that are executed, and the prices at which they occur. The process of doing so is heuristic: the dealer uses experience, judgment, and perhaps even intuition to make adjustments. This kind of complex process undertaken by many market participants underlies the simple picture of supply and demand crossing in financial markets!

Automation of the dealer's role therefore requires automation of the process of judgment. A fully automated system therefore does more than communicate information among human participants. The automated system must have a set of priority rules for executing trades. Priority will typically be based on a hierarchy of characteristics: price, time, order type (for example, orders to buy or sell at the going market price, or orders with some price limits on them), quantity, and even the amount of information revealed by the trader. Furthermore, there must be rules for setting and adjusting prices. If a human-controlled exchange exists, those prices may set the starting points for prices, but order flows, as they reveal the amount of supply and demand for each stock, will be used to adjust prices according to some prespecified rule. For example, **order books**, or listings of offers to buy and sell, can be used to execute trades whenever orders cross, that is, when the price of the best offer to buy is equal to or greater than the best offer to sell.

Figure 12.5 shows the order book for The Island, on September 2, 2000. Since this was a holiday, the stock market was closed. However, traders were still able to submit orders. In the book as shown, the lowest sell order is above the highest buy order, so no trade is possible, but a new sell order for 100 shares at 70.3125 could be met from the book, and this would be the market price. The order book also displays quantities offered or sought, the last match, and the total volume, for the day. The complete order book is not shown, since for a large, widely-held, actively-traded company such as Microsoft, there are many orders at one time. The order book only shows those that were left over when markets closed. The Island offers these order books to be displayed using

Java, so that they are automatically updated, something that would happen many, many times during a trading day.

Figure 12.5: The Island ECN's Order Book for Microsoft



MSFT

GET STOCK: MSFT go

LAST MATCH
Price 70.3125
Time 19:04:17

TODAY'S ACTIVITY
Orders 5,316
Volume 487,615

BUY ORDERS SHARES	PRICE	SELL ORDERS SHARES	PRICE
219	70.3125	30	70.3700
100	70.1250	100	70.3750
400	70.0625	1,000	70.3750
145	70.0000	515	70.4900
745	69.7500	500	70.5000
25	69.7500	100	70.5000
400	69.7500	70	70.5000
200	69.6250	129	70.5000
400	69.6250	160	70.5000
100	69.6250	125	70.5000
50	69.5128	22	70.5000
200	69.5000	500	70.6250
100	69.5000	500	70.7500
28	69.5000	500	70.7500
20	69.5000	300	71.0000
(98 more)		(470 more)	

As of 20:00:36

The internal matching of orders within an ECN represents a situation where the traditional intermediaries, the NASDAQ dealers and NYSE specialists, are removed from the transaction. This possibility has always existed for large trades, but ECNs make this an option for smaller investors and traders as well. At the same time, orders will still be displayed to human dealers or market makers, and they may choose to execute those orders, if it is favorable for them to do so. Alternatively, orders can be preferenced to a particular market maker if desired. The Illustration Box describes how Archipelago's system works.

Archipelago was one of the first ECNs that were launched in January 1997, after the Securities and Exchange Commission (SEC) permitted ECNs to link to the NASDAQ system. ECNs are broadening their scope, and in March 2000, Archipelago and the Pacific Exchange announced a plan to create the first fully electronic national stock exchange for New York Stock Exchange, American Stock Exchange and NASDAQ stocks. NYSE stocks are already traded directly on Instinet, which is the oldest ECN, having begun in 1969, and become a subsidiary of Reuters in 1987. Instinet is somewhat different from the new ECNs, and in fact does not consider itself in this category, calling itself the "world's largest agency brokerage firm". Instinet is more closed than the other ECNs, having specialized in allowing large institutional traders to transact directly over dedicated electronic networks, but in response to competition it, too, is planning to open up to individual investors.

Illustration Box
Archipelago's Order Routing and Matching

Orders in the ARCA book can be matched internally or will be preferenced to other market participants. ARCA's SmartBookTM proprietary execution algorithm utilizes an exclusive preferencing algorithm to find the best price available internally and/or externally by routing the order directly to the market(s) displaying the best price and order/execution ratio (based on % fill history, time and size shown). Multiple preferences can be sent simultaneously. Orders that are not marketable, at the time of entry, will be added to our National Order Book.

Use the ARCA system to preference an order to a specific Nasdaq Market Participant or Listed Market Center. To improve your chance of getting a fill, your directed Nasdaq order will always check the ARCA book before it routes the order to the selected Market Maker ID (MMID).

Source: www.tradearca.com

Instinet's trading volume represents an impressive fraction of the trading of many stocks of large companies. While it has a greater presence in the NASDAQ market, NYSE stocks also show up as Instinet trades (see Table 12.3). Such direct or "upstairs" trades are reported to the exchange, but they bypass the floor specialists "downstairs". In general, all the electronic networks offer lower transaction costs, partly as the result of the technology, and partly as a result of competition. They also offer better and more open information flows. Thus increased value creation and reduced value capture by intermediaries are potentially the outcome of the increased role of ECNs in financial markets.

One issue that remains to be discussed is that of trading abuses.[3] Of course human traders can engage in these, irrespective of the existence of electronic markets. The conventional model used by the NYSE and NASDAQ involves selection, reputation, and monitoring, but no doubt privileged market participants have been able to take advantage of the system (aside from simply restricting entry to facilitate value capture). What are the prospects for trading abuses in automated electronic systems? Pure electronic systems can presumably be designed to prevent prearranged, collusive trading, or failure to execute transactions openly and competitively during regular trading. A high degree of automation removes the scope for discretion, and therefore reduces such possibilities. However, the flexibility of electronic systems may make it easier for privileged traders such as dealers to take advantage of information revealed by customer orders, and "trade ahead" of the customer. Unless privileged human traders are eliminated this problem may be exacerbated. Since human traders serve other roles, such as carrying inventory, this problem will remain. Only monitoring, and competition that allows customers to switch when they are not satisfied, can act as constraints on such behavior.

Table 12.3: Instinet's Importance in Financial Trading (Sept. 1, 2000 data)

Firm	Instinet Volume	NASDAQ Volume	Instinet %
Cisco	4,717,588	33,140,000	14.2
Dell	4,714,946	28,358,700	16.6
Intel	3,823,920	18,322,000	20.9
Oracle	3,107,448	15,208,900	20.4
Microsoft	3,074,968	18,814,800	16.3
Yahoo	2,929,809	17,735,900	16.5
		NYSE Volume	
Nokia	1,431,311	18,400,200	7.8%
EDS	578,900	1,869,600	31.0%
AT&T	378,257	11,911,500	3.2%
AOL	326,890	10,673,600	3.1%

[3] We draw on the discussion of Ian Domowitz (1992).

Online Bond Trading Bonds offer an alternative to stocks (equity) as a way for firms to raise capital. They differ from stocks in that they have fixed interest payments and a specific date when the principal must be repaid. Also, bonds, unlike stocks, do not represent an ownership share in the firm. Thus bonds are the only source of finance for governments (aside from the power to print money!). US Treasury bonds, in particular, are assets that are globally held and traded in large quantities. In the US, state and municipal governments also issue bonds. Several trillion dollars of bonds are held by institutions and individuals in the US, and trading in bonds amounts to several hundred billion dollars a day.

Bond markets differ from stock markets in several ways, partly as a result of their different nature. In particular, since they are fixed income assets, they do not offer the prospects of large capital gains that have fueled so much interest in trading in stocks in the last few years. The impact and importance of information is less for bonds than for stocks. In general, the price of bonds moves in the opposite direction to interest rates, so news that will affect interest rates matters. However, only news that changes estimated default probabilities (which are zero for US Treasury bonds) will have dramatic impacts. More specifically to the opportunities for trading, bonds typically carry minimum face values of $10,000, and are therefore not therefore susceptible to trading by individual investors. Perhaps most importantly, bond trading is conducted by a restricted group of dealers. As one bond manager put it, "there are certain trading opportunities they [bond dealers] will not want to show the world online."[4] Bond traders deal with other by telephone, keeping information and opportunities within a relatively closed network that will take time to penetrate. Unlike the stock market, where screen-based trading was common well before the Internet introduced that possibility to individual investors, screen-based trading with order book displays is fairly recent for bond trading.

In sum, barriers to entry in bond trading are higher than in stock trading, and online bond trading is coming about much more slowly. The demand for online bond trading is lower than for stocks, and the simple reductions in basic transaction costs that were provided by online stock trading are less likely to be significant for bond trading. Nevertheless, there is a potential for greater value creation through better matching, simply by increasing the amount and quality of information available.

Online brokers such as Schwab and E*Trade offer online bond trading to retail investors, with many of the same features that are common in online stock brokers' and ECN's offerings: search and filtering capabilities, order routing and management, automated bids and offers, and detailed market data. These capabilities make bond markets accessible to a wider range of traders, without affecting the core business of bond dealers. E*Trade's bond trading software was developed by a software specialist, named Bond Exchange. A similar approach has been taken by BondDesk.com, which is creating what is essentially an ECN for bonds, sponsored by large institutional broker-dealers. If such innovations can increase speed, liquidity and match quality, they can offer substantial value creation to participants.

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[4] Bryan Johanson, of C.S. McKee & Co., quoted in "Corporate bond trading online slow to catch on", Reuters news story, CNET News.com, July 20, 2000.

A more radical innovation threatens the value capture of traditional bond market core participants. Trading Edge offers a service called BondLink, that allows institutions to trade high-yield corporate bonds (often colloquially known as "junk bonds") directly among themselves, bypassing Wall Street dealers. The mechanics are again quite similar to other automated stock and bond systems, with order book displays, and matching from order books. Just as large stock trades on NASDAQ or ECNs can be negotiated, BondLink includes a feature that alerts traders when orders almost match, allowing buyer and seller the option of negotiating to an agreed transaction. All these automated systems strive to provide transparency in price disclosure, while protecting anonymity of traders as desired. Systems such as BondLink may also allow trading services to be unbundled from research services, something that has already happened in online stock trading. Ultimately, they will attract more firms to issue their bonds online. Ford Motor Credit, Daimler Chrysler, **Fannie Mae** and **Freddie Mac** allow began marketing and selling bonds online in 2000.

Bonds and stocks are not the only financial assets. There are rapidly increasing numbers of derivative assets (options, futures, and much more exotic creations), which lend themselves to electronic trading, and which are gradually moving toward screen-based trading with more open access, and away from traditional trading floors where shout and hand signals are the method of sealing deals. Perhaps the largest global financial market is that for foreign exchange, and that, too appears to be taking a step toward online trading (see Illustration Box).

Illustration Box
Online Foreign Exchange Trading

In August 2000, the three largest institutions that participate in foreign exchange trading – Deutsche Bank, Chase Manhattan Bank, and Citigroup – announced that they were partnering with Reuters, perhaps the largest financial information company, to offer online foreign exchange services. Banks already have interbank electronic trading of foreign exchange (also in collaboration with Reuters), but non-bank firms have still relied on telephone quotes from banks (shades of the bond market!), allowing banks to capture value in these trades. Now the competitive nature of the inter-bank foreign exchange market, with razor-thin spreads, may be extended to other institutional investors. The ability to compare quotes on screens from multiple participants, is the key to this prediction. Individuals may have a harder time benefiting, though online brokers such as Schwab and E*Trade are exploring possibilities. Again, minimum deal sizes of $10,000 in such cases will leave out many individuals.

Source: "Online foreign exchange: At last FX online", *The Economist*, August 19, 2000, pp. 66-67.

Online IPOs Initial Public Offerings (IPOs) are how firms actually raise capital. If the value of a stock soars after an IPO, the gains go to the current stockholders, not to the company itself. Almost all stock trading takes place in existing stocks, and represents

gains and losses for stockholders, but not new capital that is at the firm's disposal. Nevertheless, every public company starts out with an IPO, so these are important events. IPOs in the US must obey strict SEC guidelines, and firms seeking to achieve successful IPOs rely on the expertise of a handful of investment banks. Many of these investment banks have global businesses, so that the top ones such as Morgan Stanley, Goldman Sachs, Deutsche Banc Alex Brown and Credit Suisse First Boston dominate the IPO business in the US as well as Europe.

The investment banks make sure that the IPO is conducted according to regulatory requirements (preparing and distributing prospectuses); they set initial prices and find institutional buyers; and they "underwrite" the offering by buying unsold shares, or even propping up the price after the IPO, by making purchases. In return they collect fees that average several percentage points of the amount raised. Thus for a $100 million IPO, an investment bank may easily pick up $6-7 million in fees. While the investment banks provide reputation, expertise, and insurance services, one can reasonably argue that much of the value capture represents economic rents collected as gatekeepers in an area where barriers to entry have been high.

As in bond trading, the entry barriers have proved quite stubborn to online competition. Fledgling firms seeking to seal their start-up success with an IPO are unlikely to want to risk it all on an untried IPO method. The first, and perhaps only successful online entrant has been Wit Capital, which began by issuing shares directly to the public for its own IPO, but has since metamorphosed into a reasonably complete online investment bank. Wit Capital has served as a secondary underwriter (essentially sharing risks and effort) with the top-tier investment banks on dozens of IPOs. Wit Capital receives a block of the IPO shares, and allocates them online, rather than using the traditional networks favored by the brick-and-mortar investment banks.

A version of the alternative, more radical model, which seeks to eliminate the intermediary (in this case the investment bank), is apparently being followed by Direct IPO, which offers direct participation in start-up firms' equity for rich investors. It is not entirely clear whether Direct IPO is providing services that would allow a firm's stock to be listed on an exchange and publicly traded, or merely extending the venture capital role to a wider group of individuals, using the Internet as an outreach tool. In any case, the direct model has not really taken off, and promising ventures that were mooted in 1998 (Internet Capital Exchange and Web IPO-Capital Formation Group) seem to have disappeared from contention.

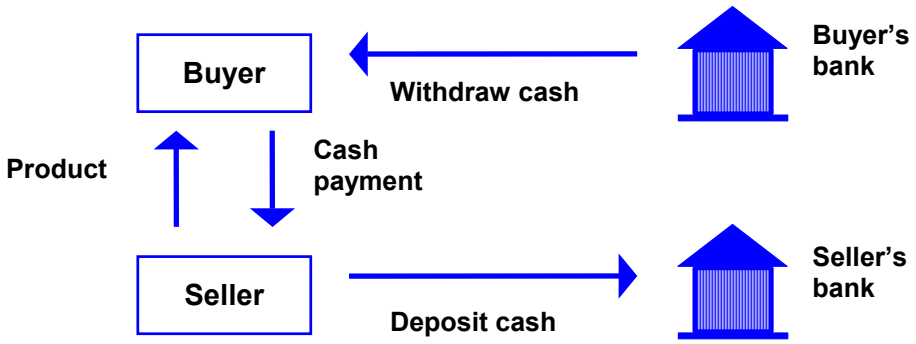
The general lesson from comparing online trading in stocks and bonds and online IPOs is that the Internet does not automatically create perfect competition and destroy economic rents. Existing intermediaries often have assets such as reputation, experience and installed customer bases that are resistant to assault by online challengers. In every case, however, the Internet's ability to increase flows of information, and to reduce access barriers, does act as a force for greater competitiveness, wearing away at entry barriers, no matter how formidably they are constructed.

12.6 Electronic Payment Systems

Financial market transactions between institutions are typically settled purely electronically. When many transactions in both directions take place during a day, a clearing house system allows more efficient settlement by aggregating all the day's transactions (see Chapter 7). Even though B2B transactions in general are almost all by check, the settlements between banks take place through a clearing house. The evolution of electronic payments involves extending the electronic network beyond financial institutions, to include all institutions and consumers. In this section, we outline how this occurs. The importance of electronic payments is that, without them, the transactional efficiencies of the Internet can not be realized. Ordering a music CD online is no better (or worse) than going to a store or traditional catalogue shopping if the buyer has to mail in a check, which must be received and cleared before the order is processed.

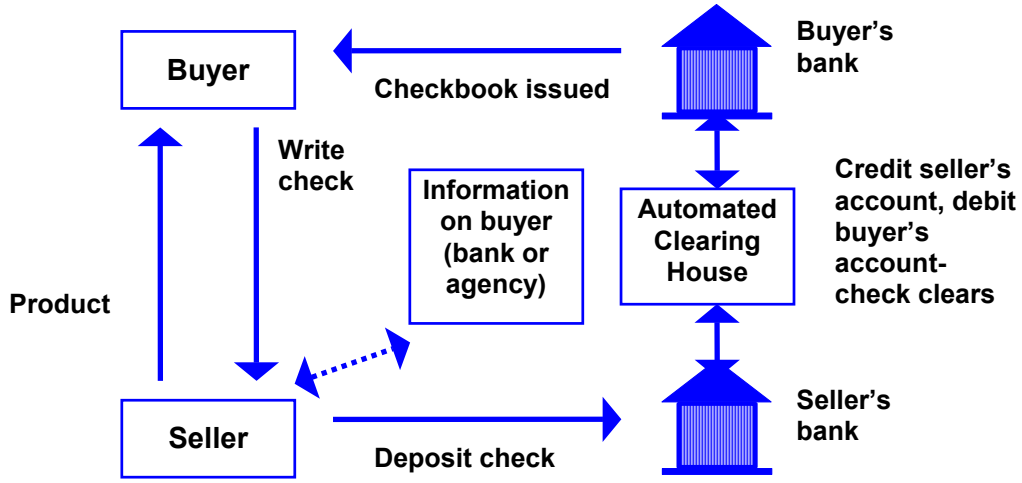
Existing Payment Systems The key to understanding electronic payments is as information flows. In fact, cash is also a kind of information carrier: the shape and size of the bill, and its denomination inform the holder what claim on physical products and services it represents. Physical transfers of cash therefore also represent transfers of information. Figure 12.6 illustrates the simple flow in a cash transaction that starts and ends at a bank. All the flows are physical flows in this case.

Figure 12.6: A Cash Transaction



Now suppose that the transaction takes place by check. Two additional steps may be added to those in a cash transaction. The check does not directly carry information that the buyer has the funds to pay: this must be verified by the seller, either directly from the buyer's bank, or indirectly from an intermediary that provides information about the buyer's history. The seller may skip this step, relying on buyer penalties for writing a "bad" check, or the seller may ensure that the check "clears" before supplying the product. Clearing the check involves the second additional step which always takes place, as shown in Figure 12.7. This step involves an electronic settlement between the buyer's and the seller's bank, through an automated clearing house. Thus no physical flow takes place between the banks.

Figure 12.7: A Check Transaction

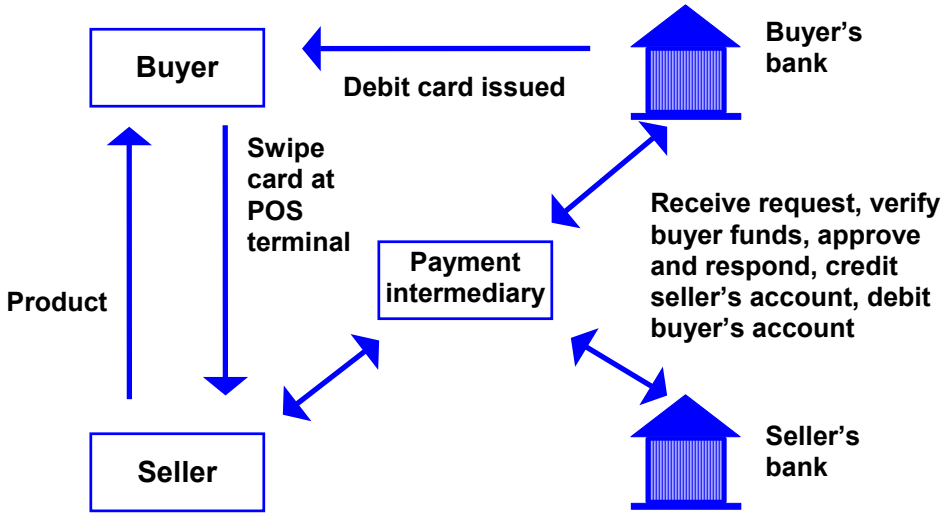


A check is superior to cash because it is more secure for the buyer. Carrying large quantities of cash can be risky, due to the possibility of loss or theft. However, the check is an imperfect information carrier, and it is cumbersome to boot. While the last step in Figure 12.7, the interbank clearing, takes place electronically and in an automated manner, previous steps that involve processing pieces of paper are time-consuming and costly. The natural next step is to replace the check with a better information carrier which preserves the security advantages of the check. The debit card (also called a check card) performs this role. Debit cards have evolved from ATM cards, and use some of the same electronic infrastructure as credit cards. While they followed credit cards in terms of the timing of introduction, credit cards involve several other institutional complexities, and we consider them later in this section.

A debit card allows information on the availability of funds to be requested and collected, and the funds transfer to be made, all at the time of the transaction, and all electronically. In a physical transaction, a point-of-sale (POS) terminal (now ubiquitous) reads the card information, and sends it over dedicated networks (typically using the telephone infrastructure) to the payment processing intermediary or clearing house. The intermediary links into the banks' information systems, verifies funds, approves the transaction, transmits it back to the POS terminal, and makes the funds transfer. This is an example of EDI, and is known as **Electronic Funds Transfer** or EFT. EFT has been steadily replacing manual methods, and the extension to the checkout counter at the store has been only the final step in EFT. Figure 12.8 summarizes the flows that occur with the debit card transaction.

The debit card model involves buyer information (account numbers, transaction details) being sent over the network. Hence security of the network is a primary concern. Firms use dedicated private networks to ensure security. In addition, the financial information can be encrypted, if desired.

Figure 12.8: A Debit Card Transaction



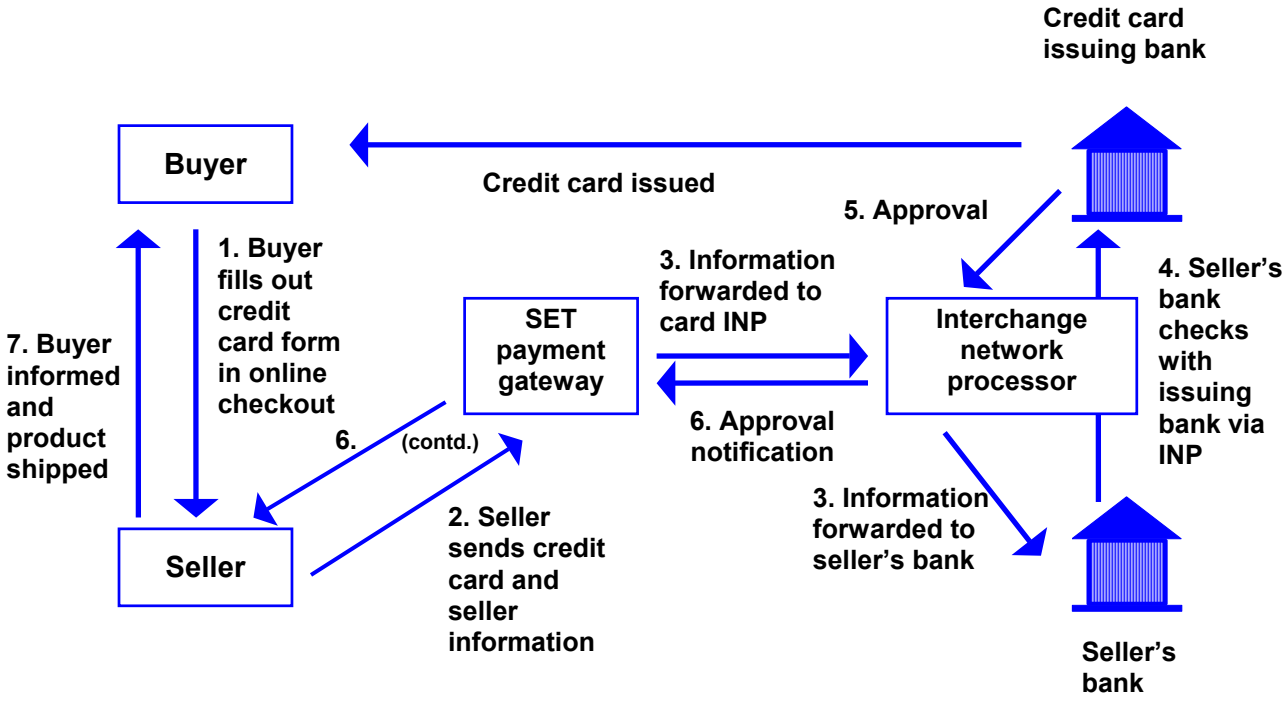
Credit card transactions are similar to debit card transactions, with the following differences. The payment processing intermediary, will link into another processing intermediary, called an interchange network processor (INP) is different in the case of credit card transactions. Each credit card brand (Visa, Mastercard, Discover, American Express) has its own INP. The INP communicates with the seller's bank and the bank (or other financial institution) that issued the buyer's credit card – in particular the latter need not be the bank where the buyer has a checking account. Thus the buyer's checking account is not debited. That step involves a separate transaction, when the buyer receives his or her monthly credit card statement, consolidating all transactions for the period, and presenting a single bill. While the seller receives its payment, and the buyer receives the product, the credit card transaction thus creates or modifies a future transaction between the credit card issuer and the buyer, which will be settled according to one of the ways shown above. A physical transaction in a store via a credit card once again uses a POS terminal and secure, dedicated, private networks over which the relevant financial information flows. Electronic payments systems can simply mean what we have described so far, with the Internet not involved at all. Our next task is to explain how using the Internet changes things for payments.

Online Payments Systems One of the key concerns for incorporating the Internet for electronic payments has been that of security of financial information. Many attempts were therefore made to minimize the amount of financial information that would have to traverse the seemingly wide open spaces of the Internet, where hackers could intercept and misuse it. The basic idea of these systems was to create membership networks that would require one-time transfers of sensitive information offline, and only limited, transaction-specific information thereafter. We will discuss these systems briefly, but the

evolution of online payments has turned out to be very different from what many people forecast

What happened is a useful illustration of the power of economic incentives. The existing credit card networks, dominated by Mastercard and Visa, provided an installed base of customers and substantial value capture for the credit card issuers and the brand holders (Mastercard and Visa) themselves. There was a strong incentive to protect the economic rents, or value captured by these participants, and the pieces of the technological puzzle fell into place quite quickly. Security technology such as Secure Sockets Layer (SSL), as discussed in Chapter 2, has become a *de facto* standard for online security, providing encryption for all kinds of sensitive data. Other innovation has allowed the development of payment processing gateways that connect online information to traditional closed financial networks. Mastercard and Visa have also pushed strongly to develop a new standard for online payments processing. The name of this standard is Secure Electronic Transaction, or SET. Together, SSL and SET (or alternative payment gateways) have made credit cards the standard way to pay online. The mechanics of an online transaction paid for with a credit card are shown in Figure 12.9.

Figure 12.9: An Online Credit Card Transaction



Everything to the right of the SET payment gateway in Figure 12.9 is the same for a credit card transaction initiated in a brick-and-mortar store, via mail order, or via the telephone. The differences arise on the left-hand-side of the diagram. The key innovations are software innovations that allow the seller to manage information provided online by the buyer, and the payment gateway to link the online seller and the traditional EFT networks. Larger sellers may write their own credit card processing

software as part of their overall e-commerce software. Smaller sellers typically use standardized credit card handling software, which is typically easily integrated with the rest of the e-commerce software that manages all the other stages of shopping online. In Figure 12.9, we have begun with step 1 initiating the payment process. All the other steps involved in comparing, inquiring, and choosing the product to be finally ordered are assumed to have already taken place.

One final aspect of online credit card processing involves authentication. A seller may visually inspect a credit card in a store, or ask for other ID, to authenticate the buyer. A seller communicating over an EFT network will also have some method to provide authentication for itself. SET also has capabilities to provide digital certificates (Chapters 2 and 3) for the seller and the buyer, but in practice only seller digital certificates are currently used. Thus fake Web sites designed to steal credit card numbers can be excluded. Buyer digital certificates will require smart cards to hold them to provide portability, and adoption of such cards will probably be slow. In fact, the digital certificate capability is the main added value of SET, so its own adoption rests on the spread of digital certificate use. Since consumers seem to have become comfortable providing credit card numbers online (at least to well-known sellers), consumer digital certificates may remain a relative rarity.

What about other online payment schemes? As noted, one advantage that they provide over online credit card payment is that financial information associated with the customer or firm (buyer credit card numbers in particular) does not have to be sent over the Internet. Instead, the information is provided only at the time of an initial membership sign-up. Thereafter, the information that is exchanged online during a specific transaction is quite limited. Such online **payment clearing services** (PCSs) required a critical mass of buyers and sellers to sign up in order for their value to be realized. Furthermore, initial online PCSs were offered by relatively new firms, and they had difficulty establishing their reputation and credibility. PCSs had to be "trusted third-party" intermediaries, interacting with member buyers and sellers, as well as with their banks. Thus there were multiple "chicken-and-egg" problems in building successful online payment clearing services. On top of this, as we have discussed, credit card brands overcame their own barriers to operating online, reducing the value added of PCSs.

An alternative approach to PCSs has been that of companies like CyberCash. CyberCash provides various kinds of payment software for online sellers, but also provides services for them. Thus it acts as a specialist outsourcer for such firms. Initially, CyberCash also attempted to provide services for buyers, such as electronic wallets and electronic bill presentment (see Chapter 20). As in many other cases involving financial products and services, consumers are very cautious about switching to new methods of doing things (see Chapter 16 for a discussion of switching costs), and CyberCash withdrew from consumer applications.

While PCSs and companies like CyberCash offered only limited departures from what is now the dominant online credit card payment model, a radical alternative is

provided by the concept of digital currency as a means of payment online. In the case of digital currency, a digital product representing value (e-currency, e-cash, or digital cash) is transmitted instead of payment information. Digital currency, like paper money, offers the advantages of anonymity and convenience. In addition, digital currency has lower transaction costs relative to credit card payments, and could be more suitable for making payments for online microproducts, as discussed in Chapter 9.

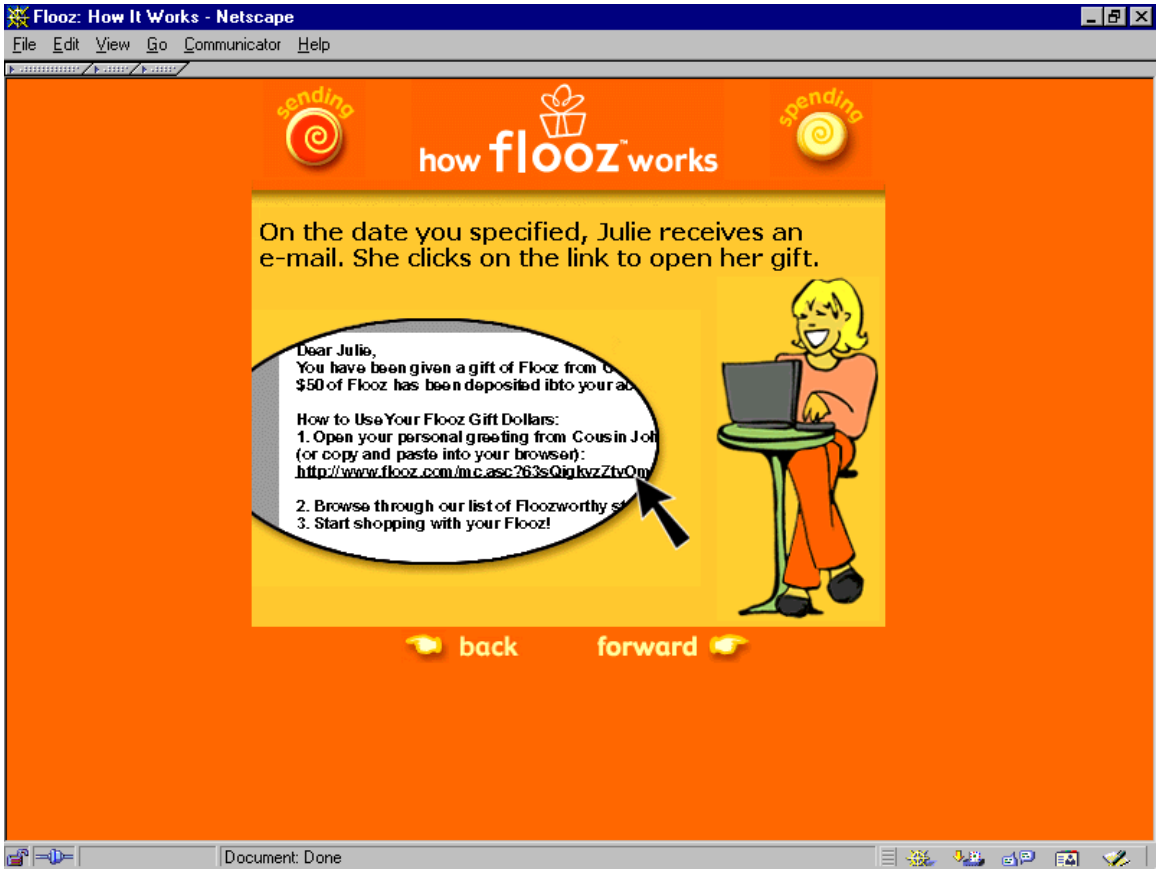
Several firms have tried and failed to introduce digital currencies. Why has digital currency not taken off? Double-spending, counterfeiting and storage are certainly very important technological issues that must be tackled, but such problems may be more soluble than the fundamental problem of building a network of users from scratch. A privately created digital currency can only be used among those who are willing to accept it as payment. However, acceptance by one person depends on whether they think others will be willing to take it in turn. The problem that someone may be stuck with a worthless piece of paper limits acceptance. Lest one think that this is a remote problem, it is worth noting that, throughout history there have been cases where even the paper currencies of governments have lost confidence, and been caught in a spiral of decreasing value.

All kinds of limited-purpose or limited-use currency do exist. "Geoffrey dollars", for example, can be used only in Toys'R'Us stores, to purchase their merchandise. Disney dollars are similar type of company-specific "currency", but one that may be accepted by franchisees within Disneyland. These examples are basically just gift certificates in various fixed denominations. An example of a local currency that is not backed by a corporation is Ithaca "Hours", which have an exchange rate of 1 Hour to $10. Many local companies and individuals in Ithaca, New York have agreed to accept Ithaca Hours as payment for products and services. Just as Disney dollars keep spending within Disneyland, Ithaca Hours aim to keep spending by local people within the community of Ithaca.

Where more ambitious attempts to establish online digital currencies have foundered, the idea of currencies for gift giving and for particular communities seems to have transferred over to the Web. One well-known example of an online gift-giving currency is Flooz (see Figure 12.10), which has signed up a significant number of merchants. Ultimately, Flooz are electronic gift certificates that are accepted by a pre-arranged set of online sellers, rather than a single one, and that can be redeemed by sellers for the national currency. Flooz is sent by email with a greeting card to go with it, after the sender purchases the Flooz online (via a credit card!). Not surprisingly, Flooz has many imitators and competitors, and while these all may survive with limited roles, none of them is of course close to being a true online currency. It is safe to predict that an explicit online currency is unlikely to develop any time in the near future. Nevertheless, the ability to transfer value electronically online does accelerate a process whereby national governments have less control over their supply of money, which consists not just of notes and coins, but bank deposits and other liquid financial assets that can notionally be converted to currency at will (see Chapter 23). Certainly national governments have no desire to promote this process, which also adversely affects their

ability to detect illegal transactions. In such cases, the anonymity of currency is very undesirable!

Figure 12.10: How Flooz works



12.7 Conclusion

Online payments are only the last link in the redefinition of markets that is taking place thanks to the Internet. Online markets for products and services as well as for financial assets provide reduced costs of reaching agreement and completing transactions. They improve the quality of information flows, enabling better matches to be made between buyers and sellers, and of course they make it easier for buyers and sellers from all over to meet. The Internet is just the latest advance in a process that has included postal services, the telegraph and telephone, improved physical transportation, and so on. Perhaps what sets the Internet and World Wide Web apart from all previous innovations is the ability to provide a great amount of rich information through one channel, and to integrate information processing, storage and communication, making it possible to come quite close to the ideal market in all kinds of situations where it would not have been possible before.

Summary

- Economic theory predicts that increased online competition for identical products will lower prices, increase price responsiveness, and reduce price dispersion. While the evidence from B2C posted price markets supports the first prediction, the evidence for the second is mixed, and substantial price dispersion appears to persist online.
- Online auctions represent a significant use of the power of the Internet to bring together buyers and sellers, and implement a transparent process of reaching price agreement. Their use for C2C transactions is spreading to B2C and B2B transactions of all kinds, and significant innovations are occurring in auction design and implementation.
- B2B transactions are a major component of online commerce. They can be classified by the industry-specificity of the products sold, as well as by whether the products require long-term contracting or are suitable for spot transactions.
- B2B transactions can be conducted on exchanges similar to financial exchanges, through one-sided auctions, or through posted prices: only the latter are common for most first-sale B2B transactions.
- While financial markets have been relatively efficient for some time, online financial markets permit greater access and transparency, and they improve information flows and reduce the costs of conducting transactions. Some of the greatest potential for increased efficiency (and reduction of economic rents) is in markets for bond trading and for IPOs.
- Online payments in the US have evolved chiefly through the extension of the existing credit card infrastructure to include online buyers and sellers. Alternative online payment methods such payment clearing services and digital currencies have not succeeded, partly because the additional value they provide is not overwhelming, and partly because of the entry barriers created by switching costs and network externalities.

Questions

1. Is price dispersion possible in the stock market? In other words, can two people pay different prices for the same stock at the same time? Why do you think this might happen? Can online stock trading reduce its occurrence?
2. How much do you think eBay's revenue can grow? Would its accounting profits grow at the same rate, faster, or slower? Justify your answer.
3. Visa and Mastercard have been able to extend their dominance of the credit card business to online payments. Does this have lessons for the likely evolution of online B2B markets?