Competitive Forces
Revised: August 31, 2001

Business is a challenge. If you have a good idea, how do you know others don’t have the same or similar ideas? If you have the idea first, why can’t they imitate? If you execute well, why can’t they imitate that, too? The impact of competition is ultimately to make it difficult to make more than a normal, risk-adjusted rate of return. From a business point of view, that’s the challenge. From a consumer point of view, that’s what leads resources to move to their most valuable uses (profit being a good indicator of usefulness).

This lecture is devoted to competitive forces: how they work, how to work around them, and how (and why) governments tend to set rules limiting competitive behavior.

Industry Structure

Industries vary widely in range of products (broad or narrow), geographic scope (cement is harder to transport long distances than CDs), cost structure (how does the minimum efficient scale compare to the size of the market?), number of firms (presumably related to costs), and intensity of competition (vaguely related to the number of firms).

Exhibit 1 describes several mostly-US industries in broad terms. In addition to a name, each industry comes with an SIC code (“standard industrial classification”), which can be used to identify it. Most are “4-digit” codes, which define industries with a modest amount of detail. Even so, many of the industries listed cover a wide range of products. Telecommunications, for example, covers local service, long distance, wireless, and a variety of specialist providers. If we wanted to understand the industry in any depth, we’d want to look at finer categories.

These industries differ in a number of respects. One is how “concentrated” they are: how dominant the largest firms are in terms of their market shares. The “4-firm share” (sometimes called the 4-firm concentration ratio) is the market share (these are computed from revenue) of the largest 4 firms. They range from 1.8% for legal services (there are lots of law firms, and even the largest isn’t very big relative to the market overall) to 84.8% for aircraft manufacture (where, to be honest, a national number is less meaningful than a global one).

Another measure of concentration is the “Herfindahl-Hirschman Index” (HHI), which is widely used by regulators to guide decisions on mergers. The HHI is computed by

\[ HHI = (s_1)^2 + (s_2)^2 + (s_3)^2 + \ldots + (s_n)^2, \]
the sum of the squared market shares (expressed as percentages) of the firms in the industry. If this sounds somewhat esoteric, note that a monopoly would have HHI=10,000 \([=100^2]\), an industry with many small firms would have HHI close to zero, and an industry with 4 equal-size firms would have HHI=2500 \([=25^2+25^2+25^2+25^2]\) (approximately what we see for motor vehicles).

These are relatively crude measures. Depending on the industry, one might want to see finer product categories and/or regional differences (for airlines, for example, concentration is considerably greater at individual airports).

These concentration measures don’t tell us how intense the competition is, but they’re a start. Generally we’d expect to see intense competition if there are many firms, no competition if there is one firm, and something in between if there are a few firms. The plan for the course is to look at the two polar cases first (competition and monopoly), then turn to the more complex issue of how a small number of firms (an “oligopoly”) might interact. (The latter is where the fun is, but you’ll have a wait a little.)

Perfect Competition

One extreme end of the “intensity of competition” spectrum is what we term a “perfectly competitive” industry: one with no barriers to competition. Under these conditions, it’s virtually impossible to make more than a normal risk-adjusted return on investment. If one were to make more, imitation and competition would tend to drive profits down.

Consider the competitive forces unleashed by these conditions:

- Atomistic firms. Many firms, all small relative to the market and unable to affect the market price through their actions. Moreover, the minimum efficient scale is small relative to the size of the market.
- Homogeneous product. Competitors produce exactly the same product (and therefore compete head to head on price, the only remaining variable).
- Perfect information about price and quality. And everyone knows it’s the same product.
- Free entry and access to technology. Imitation is possible: others can enter the business if it’s profitable with (eventually) the same costs as incumbents.

Under these conditions, which we term “perfect competition,” we’d expect intense competition. We’ll talk shortly about how this works.

Perhaps more interesting, violations of these conditions provide an outline of coming attractions. With one or few firms, we have a monopoly (later this class) or an oligopoly (which leads to complex strategic interactions that we’ll study in the second half of the course). With differentiated products, we moderate the impact of competition (a recurring theme) and open up the issue of product positioning (a subject for later). With imperfect information, we open up the issue of branding (a brand often being a signal of
quality). With entry and access to technology, we raise the issues of scale economies (done), patent protection and intellectual property (later), and network effects (later). Stated differently: if a firm has a sustainable competitive advantage, it must lie in a violation of one of these conditions.

Let’s look more closely at a market or industry under conditions of perfect competition. First, each firm faces effectively a flat (“infinitely elastic”) demand curve: it can sell all it wants at the market price. Why? Because each firm is small relative to the whole market and has no impact on the price. People sometime refer to the market as “atomistic,” since each firm is like an atom. We know that under these conditions, each firm’s supply decision is governed by its marginal cost curve. It supplies the quantity at which price equals marginal cost. If we put all firms together, we sum their supply at each price to come up with the market supply curve. The equilibrium price is where supply and demand cross.

Depending on the number of firms in the market, this may result in a short-run equilibrium in which price is above average cost (meaning firms are making above-normal profits), below (firms are losing money), or equal. But firms are doing their best, given their prior choice to enter the market.

The next stage of competition concerns the decisions of these firms, plus potential entrants, to stay, enter, or leave the industry. Suppose price is greater than average cost. Then we’d expect incumbent firms to expand their capacity and new firms to enter. As a result, the market supply curve shifts to the right, driving down the price. This may take some time, but the ultimate effect is to drive profits to zero (by which we mean normal levels). Conversely, if price is below average cost, then some firms will leave the industry, the supply curve will shift to the left, and firms will eventually attain a normal level of profit.

What did we assume in this analysis? Basically everything on our list. We assumed (clearly) that there were many firms and that they had U-shaped (or L-shaped) average cost curves whose minimum efficient scale left room for many firms. We also assumed free entry: others could enter the industry if they wished. In addition, we assumed that everyone had the same cost structure (free access to technology). If not, then you’d expect the high cost firms to leave first. Of the firms that are left, those with the lowest cost might expect to have above-average profits as long as the cost advantage lasted. Our assumption is that most such advantages can eventually be replicated, driving profits to back to normal.

That’s the theory: that unusually high (or low) profits should be short-lived. But is that right? The evidence for large firms is that differences in profit rates across companies can last for decades. Although the source of these differences remains somewhat of a mystery, they appear to be related to industry characteristics, scale economies, market share, and research and development intensity. Related work suggests that one of the more persistent sources of high performance is “organizational capital:” the processes
that underlie the organization of the firm. Thus Toyota’s production system has proven very hard to imitate. Similarly, existing airlines have found it difficult to reproduce the low-cost, high-value delivery system used by Southwest (although new entrants seem to find it easier).

Monopoly

A firm that is large enough to influence price will generally restrict output and raise price. (We’ll go into this in more detail later, but we hope this claim is persuasive, or at least believable.) That’s good for the firm, in the sense that the monopoly position is profitable. But is it good for society as a whole?

The economic basis for competition policy goes back to Adam Smith’s “invisible hand.” We expect the forces of competition to allocate resources where they are most valuable, thus increasing the welfare of consumers. A monopoly, however, restricts output, raises price, and attracts fewer resources to the industry than one would get under competitive conditions. In a sense, not enough resources are allocated to the industry. Theoretically, we might note that the sum of consumer surplus and producer surplus (profit) is lower under monopoly. The difference is termed the “deadweight loss” of monopoly.

All this could change if there are economies of scale. In this case, the costs would be higher with competition. The question, then, is whether the cost advantage of monopoly exceeds its markup.

Government Policy

Firms and industries range from government-owned and operated (Post Office) to regulated (telecommunications, local utilities, pharmaceuticals, financial services), to unregulated but subject to laws on fraud, anti-trust, and so on. As economist Andreu Mas-Colell once said: “The invisible hand of the free market apparently needs a lot of help.” That’s true even in the US, the bastion of free markets.

*Competition policy.* Most countries have laws enforcing competition: outlawing price agreements among competitors, restricting mergers that substantially increase market concentration, and limiting the behavior of monopolies and near-monopolies.

Most countries outlaw price fixing: when two or more firms get together to agree on price and carve up the market. In effect, they are agreeing to act collectively as a monopoly (the term is “cartel”). The DeBeers diamond cartel is a good example.

Many countries also limit mergers that they feel would reduce competition in one or more markets. In the US, the Department of Justice has guidelines based on the HHI. As a rule of thumb, mergers that lead to an HHI of 1000 or less ordinarily lead to no further scrutiny; those that raise the HHI by 100 or more and produce a post-merger HHI between 1000 and 1800 raise significant questions; and those that raise the HHI by 50 or
more and produce a post-merger HHI above 1800 raise significant concern. All of this is contingent on the definition of the market (geographic, range of products).

Monopolies themselves are not illegal, although monopolies generally have an obligation not to exploit their monopoly advantage to enter other markets. That was an issue in the Microsoft case: whether Microsoft had used its monopoly position in operating systems to extend its reach to the browser market.

International issues have become increasingly important, the ill-fated GE/Honeywell deal being just the latest example. In this case, a merger of two US firms was blocked by the EU’s Competition Commission on the grounds that it would reduce competition in some European markets (specifically, aircraft engines).

*Regulation of monopolies.* Typically, industries in which the minimum efficient scale leaves room for only a single producer are regulated. The basic theory of regulation is to force a price equal to what we’d see under competition. Experience tells us, though, that poorly implemented regulation can be as bad as unfettered monopoly. Governments continue to experiment with new approaches.

*Essential facilities.* A critical issue in monopoly regulation is what to regulate. For years, governments regulated telecommunications in their entirety. But more recently governments have loosened restrictions on long distance service, which is increasingly competitive. Local service, however, is generally regulated by states. The argument is that the local connection is a natural monopoly (it’s expensive to build more than one) and should be regulated, but long distance is not. Similar arguments have been applied to electricity.

More on all of this later.

*Written by David Backus and Luís Cabral.* © 2001 Luís Cabral and David Backus.
## Exhibit 1. Properties of Selected Industries

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<tr>
<th>Industry</th>
<th>SIC Code</th>
<th>4-Firm Share</th>
<th>HHI</th>
<th>Region</th>
<th>Source (Date)</th>
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<tr>
<td>Electric power</td>
<td>2211</td>
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<tr>
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<td>Computers</td>
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<tr>
<td>Semiconductors</td>
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<td>52.5</td>
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</tr>
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<td>Motor vehicles</td>
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</tr>
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<tr>
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<td>Motion pictures</td>
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<td>Wholesale banking</td>
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<td></td>
<td>716</td>
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<td>Roy Smith (98)</td>
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<tr>
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<td>Performing arts cos.</td>
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<td>8.5</td>
<td></td>
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<td>Commerce (97)</td>
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Sources. US Commerce web site, Roy Smith.