12.1 A Warning from Intel’s Founder

When Andy Grove speaks about technology, people listen. In 1968, he co-founded Intel, which invented the microprocessor—the chip that drives your computer—and dominated the semiconductor business for decades.

So many people took notice in 2010 when Grove issued a stark warning about the fate of U.S. high technology: The erosion of manufacturing employment in technology industries, he argued, undermines the conditions for future innovation.[[1]](#footnote-1) Grove wrote:

Startups are a wonderful thing, but they cannot by themselves increase tech employment. Equally important is what comes after that mythical moment of creation in the garage, as technology goes from prototype to mass production. This is the phase where companies scale up. They work out design details, figure out how to make things affordably, build factories, and hire people by the thousands. Scaling is hard work but necessary to make innovation matter.

The scaling process is no longer happening in the U.S. And as long as that’s the case, plowing capital into young companies that build their factories elsewhere will continue to yield a bad return in terms of American jobs.

In effect, Grove was arguing that technological spillovers require more than researchers; they require the presence of large numbers of workers putting new ideas to work. If he’s right, his assertion constitutes a strong argument for industrial targeting.

12.2 When the Chips Were Up

During the years when arguments about the effectiveness of strategic trade policy were at their height, advocates of a more interventionist trade policy on the part of the United States often claimed that Japan had prospered by deliberately promoting key industries. By the early 1990s, one example in particular— that of semiconductor chips—had become exhibit A in the case that promoting key industries “works.” Indeed, when author James Fallows published a series of articles in 1994 attacking free trade ideology and alleging the superiority of Japanese- style interventionism, he began with a piece titled “The Parable of the Chips.” By the end of the 1990s, however, the example of semiconductors had come to seem an object lesson in the pitfalls of activist trade policy.

A semiconductor chip is a small piece of silicon on which complex circuits have been etched. As we saw on page 296, the industry began in the United States when the U.S. firm Intel introduced the first microprocessor, the brains of a computer on a chip. Since then, the industry has experienced rapid yet peculiarly predictable technological change: Roughly every 18 months, the number of circuits that can be etched on a chip doubles, a rule known as Moore’s Law. This progress underlies much of the information technology revolution of the last three decades.

Japan broke into the semiconductor market in the late 1970s. The industry was definitely targeted by the Japanese government, which supported a research effort that helped build domestic technological capacity. The sums involved in this subsidy, however, were fairly small. The main component of Japan’s activist trade policy, according to U.S. critics, was tacit protectionism. Although Japan had few formal tariffs or other barriers to imports, U.S. firms found that once Japan was able to manufacture a given type of semiconductor chip, few U.S. products were sold in that country. Critics alleged that there was a tacit understanding by Japanese firms in such industries as consumer electronics, in which Japan was already a leading producer, that they should buy domestic semiconductors, even if the price was higher or the quality lower than that for competing U.S. products. Was this assertion true? The facts of the case are in dispute to this day.

Observers also alleged that the protected Japanese market—if that was indeed what it was—indirectly promoted Japan’s ability to export semiconductors. The argument went like this: Semiconductor production is characterized by a steep learning curve (recall the discussion of dynamic scale economies in Chapter 7). Guaranteed a large domestic market, Japanese semiconductor producers were certain they would be able to work their way down the learning curve, which meant they were willing to invest in new plants that could also produce for export.

It remains unclear to what extent these policies led to Japan’s success in taking a large share of the semiconductor market. Some features of the Japanese industrial system may have given the country a “natural” comparative advantage in semiconductor production, where quality control is a crucial concern. During the 1970s and 1980s, Japanese factories developed a new approach to manufacturing based on, among other things, setting acceptable levels of defects much lower than those that had been standard in the United States.

In any case, by the mid-1980s Japan had surpassed the United States in sales of one type of semiconductor, which was widely regarded as crucial to industry success: random access memories, or RAMs. The argument that RAM production was the key to dominating the whole semiconductor industry rested on the belief that it would yield both strong technological externalities and excess returns. RAMs were the largest-volume form of semiconductors; industry experts asserted that the know-how acquired in RAM production was essential to a nation’s ability to keep up with advancing technology in other semiconductors, such as microprocessors. So it was widely predicted that Japan’s dominance in RAMs would soon translate into dominance in the production of semiconductors generally—and that this supremacy, in turn, would give Japan an advantage in the production of many other goods that used semiconductors.

It was also widely believed that although the manufacture of RAMs had not been a highly profitable business before 1990, it would eventually become an industry characterized by excess returns. The reason was that the number of firms producing RAMs had steadily fallen: In each successive generation of chips, some producers had exited the sector, with no new entrants. Eventually, many observers thought, there would be only two or three highly profitable RAM producers left.

During the decade of the 1990s, however, both justifications for targeting RAMs— technological externalities and excess returns—apparently failed to materialize. On one side, Japan’s lead in RAMs ultimately did not translate into an advantage in other types of semiconductors: For example, American firms retained a secure lead in microprocessors. On the other side, instead of continuing to shrink, the number of RAM producers began to rise again, with the main new entrants from South Korea and other newly industrializing economies. By the end of the 1990s, RAM production was regarded as a “commodity” business: Many people could make RAMs, and there was nothing especially strategic about the sector.

The important lesson seems to be how hard it is to select industries to promote. The semiconductor industry appeared, on its face, to have all the attributes of a sector suitable for activist trade policy. But in the end, it yielded neither strong externalities nor excess returns.

12.3 A Tragedy in Bangladesh

Bangladesh is a very poor country. According to World Bank estimates, in 2010 some 77 percent of Bangladeshis were living on the equivalent of less than $2 a day, and 43 percent were living on less than $1.25 a day. Incredibly, however, these numbers reflected a major improvement from the not-so-distant past: In 1992, 93 percent of the population lived on less than $2 a day in today’s dollars, 67 percent on less than $1.25.

This decline in poverty was the byproduct of two decades of impressive economic growth that doubled the nation’s GDP per capita. Bangladeshi growth, in turn, relied crucially on rising exports, specifically, exports of apparel. As we noted in Chapter 11, the Bangladeshi clothing industry is a classic case of comparative advantage: It has relatively low productivity, even compared with other developing countries, but Bangladesh has even lower relative productivity in other industries, so it has become a clothing export powerhouse.

Bangladeshi competitiveness in clothing depends, however, on low wages and poor working conditions. How poor? On April 24, 2013, the world was shocked by news that an eight-story building in Bangladesh, containing a number of garment factories, had collapsed, killing more than 1,200 people. Inquiries revealed that cracks had appeared in the building the day before, but garment workers had been ordered back to work anyway. It also appeared that the building was structurally unsuited for manufacturing work and may have had extra stories added without a permit.

And who was buying the clothing made under these unsafe conditions? We were: The factories in the building were supplying clothing to a number of popular Western clothing brands.

Clearly, Bangladesh needs to take steps to protect its workers, starting by enforcing its own building and worker-safety laws. But how should consumers in wealthy nations—that means, among other people, you—respond?

An immediate, instinctive response is that we shouldn’t buy goods produced in countries where workers are treated so badly. Yet as we’ve just seen, Bangladesh desperately needs to keep exporting clothing, and it can only do so if its workers receive very low wages by Western standards. Indeed, it needs to pay less even than China, whose apparel industry has higher productivity. And low wages and poor working conditions tend, whatever we might like, to go together.

Does this mean that nothing can be done to help Bangladeshi workers that won’t end up hurting them instead? No. One can imagine trying, either by law or simply through consumer pressure, some basic standards for working conditions that apply not just to Bangladesh but to its competitors. Provided that they’re not too ambitious, such standards could make life better for Bangladeshi workers without destroying the exports the country relies on.

But it won’t be easy, and one shouldn’t expect too much from such measures. For the foreseeable future, two uncomfortable facts will continue to be true when it comes to trade with poor countries: Workers in those countries will suffer from worse wages and working conditions than Westerners can easily imagine, yet refusing to buy what those workers produce would make them much worse off.

1. Andy Grove, “How to Make an American Job Before It’s Too Late,” Bloomberg.com, July 1, 2010. [↑](#footnote-ref-1)