

MISTAKES IN OUR GLOBAL THINKING

Built to Break

The International System of Bottlenecks in the New Era of Monopoly

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Almost unnoticed, the world has become increasingly dependent on one or two suppliers for key materials and parts. How did this happen? The author traces the evolution of a new and powerful trend in international business that goes largely unnoticed. The consequences, however, are clear. The world is far more susceptible than ever before to industrial disruption, and even crashes, due to events in only one country.

IN THE FIRST DAYS after towering tsunamis smashed Japan's north coast last March, many economists believed that the disaster would have little effect on growth around the world. The region is much less industrialized than southern Japan, so the thinking went, hence the disruptions

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would likely be smaller than those caused by the massive Kobe earthquake of 1995. Such hopes did not last. By June, it was clear that the tsunamis had caused an unprecedented “supply paralysis” (Reynolds 2011) that, in turn, helped to trigger what one economics reporter called a “remarkably synchronized worldwide economic slowdown” (Kaiser 2011).

After the panic of September 2008, the story was much the same. That time, however, it was a demand shock that set off a production slowdown that cascaded around the world. The climax came two months later, when Ford CEO Alan Mulally asked Congress to bail out his firm’s competitors General Motors and Chrysler to avoid collapse of the entire automotive production system. The industry, he said, had become “uniquely interdependent . . . with respect to our supply base.” Any bankruptcy by a top-tier firm would disrupt parts production, which in turn would mean Ford—along with the U.S. operations of Toyota, Nissan, and Honda—would “not be able to produce vehicles” (Alan R. Mulally, president and chief executive officer of the Ford Motor Company, testimony before the Senate Banking Committee, November 18, 2008).

We have known for a century and a half that the highly interlinked structure of the financial system means that a panic in one country can trigger outside effects in another. But what we saw after the Tohoku earthquake of 2011 and the Lehman Brothers collapse in 2008 were examples of a new phenomenon—the industrial crash. The industrial system is also highly interlinked internationally. It is a phenomenon that poses entirely new risks, to individual businesses and to our society as a whole. These risks range from the amplification or even triggering of financial crashes to the outright seizing up of vital systems of supply.

Hence the industrial crash is a phenomenon that demands that we answer two questions: How bad a worst-case scenario can we imagine? And if those stakes seem too high, what, if anything, can we do to fix the problem?

Chain Reactions

The cascading chain reactions triggered by the disaster in Japan and the collapse of Lehman were not the first industrial crashes or near-

crashes. On the contrary, numerous such disruptions have occurred over the past twelve years. Reviewing a few of these events is a good way to get a sense of the potential magnitude of the dangers posed by this new phenomenon—and indeed to define clearly what we mean when we speak of an “industrial crash.”

The first true industrial crash took place in September 1999, after a magnitude 7.6 earthquake paralyzed commerce in much of Taiwan. Within days, assembly lines across Asia and the United States began to seize up, due to a break in the flow of semiconductors out of Hsin-chu, an industrial city south of Taipei. The quake had not damaged the semiconductor foundries themselves, and the exportation of chips resumed as soon as workers restored power to Taiwan’s airports. Yet the cut-off—which lasted about a week—left many electronics production systems snarled for months.

We saw similar outsize effects after a small fire in a semiconductor plant in New Mexico in 2000; when the U.S. government shut borders and grounded airliners after the attacks of September 11, 2001; and when the SARS (severe acute respiratory syndrome) epidemic disrupted trans-Pacific air travel in 2003. More recently, similar cascading shutdowns of production were caused by the eruption of a volcano in Iceland, by political riots in Thailand, and by flooding in and around Bangkok.

All these events share three basic characteristics: a large portion of the capacity to produce some “keystone” industrial component is located in one region or even one factory; some natural or political disaster cuts that region or factory off from a larger production system; and there are no readily available substitutes. In some cases—especially with products like semiconductors, chemicals, and certain forms of information—a single keystone region or factory may prop up multiple industries simultaneously.

From the point of view of the managers of these top-tier industries, the keystone component is often all but invisible, buried deep in a component sourced from a distant and perhaps entirely unknown subsupplier. As one auto industry consultant put it after the recent disaster in Japan, “What vehicle manufacturers are finding are parts

within parts within parts within parts that are sourced from a single-source Japanese manufacturer” (Dave Andrea, vice-president of the Original Equipment Suppliers Association, quoted in Reed and Simon 2011).

So far, none of the crashes has resulted in what could be termed a “catastrophic” destruction of life or property. Unfortunately, this appears to be due only to luck. To get a sense of the potential magnitude of a disruption, consider what would have happened had India and Pakistan actually gone to war a decade ago. Although the risk of conflict today seems remote, the two countries twice mobilized troops—in December 2001 and May 2002—and twice threatened to use nuclear weapons against each other.

Although neither country was at the time a major manufacturer of physical components, India had already emerged as a main center for the back-office work that supports some of the world’s largest multinational corporations, including General Electric and American Express. Such work can include data entry, check processing, and programming as well as call centers. A great portion of this work is then exported—in digital form—in real time to businesses in the United States, Europe, and East Asia.

As many of these businesses realized at the time, the electromagnetic pulse from the explosion of even a single nuclear device would shut down India’s telecom systems. This would, in turn, disrupt their firms’ ability to export this vital work to their operations in the United States, which would then paralyze their ability to process even basic information. The danger was not that the storage of data itself had been concentrated—after the September 11 attacks the Federal Reserve swiftly directed large firms to back up key financial information in at least two locations, as far apart physically as is technologically feasible. The danger derives from concentration of the capacity to process the data.

Nor is it hard to discover other similar concentrations of capacity that—if cut off suddenly—would result in disruptions far worse than any we have yet experienced. Some 60 percent of the world’s DRAM (dynamic random-access memory) chip manufacturing capacity is located

in South Korea, mainly in and around Seoul. More than 80 percent of the raw chemicals that go into the U.S. pharmaceutical system are manufactured in China. All the ascorbic acid (Vitamin C) used to preserve processed foods in the United States now comes from China.

Such a mapping of production bottlenecks also helps to expand our understanding of what sorts of events might trigger a shutdown. In addition to natural and financial disasters, we can imagine any number of political acts that would paralyze these systems. In some cases the disruption of business would be an unintended by-product of a conscious act—such as a Tiananmen-style pro-democracy uprising in China. In other cases, the disruption would be the intended result of an action by some nonstate terror organization or some political faction within a nation. It is also not hard to imagine a sovereign government severing a vital system of supply to coerce a trading partner toward some political end. In fact, China did so in 2010, when it cut off the export of rare earth metals to Japan in a dispute over a group of islands in the East China Sea.

Given that the main task of industrial systems is to manipulate and transport components and products that are generally not easily substitutable (or fungible, as are the various forms of money), it is probably prudent to view these crashes, near-crashes, and easily imaginable crashes as warnings of events from which it would be very hard to recover. And given the multiplicity of bottlenecks, and the almost infinite variety of conceivable threats, it is also probably reasonable to conclude that it is only a matter of time before we experience such a truly catastrophic event.

A Revolution in Antitrust

With so much at stake, we appear to have little choice but to reconfigure these systems to be more resilient. To do so effectively and constructively, we must first understand how this danger came to be. Fortunately, the origins of these industrial crashes do not lie in some vaguely remembered past. Well into the 1990s, large-scale crashes like those we have witnessed or can imagine simply would not have happened.

Two decades ago, the “global” industrial system—viewed as a whole—was doubly compartmentalized. Most industrially advanced countries were largely self-sufficient in the production of most vital goods. So, too, were most top-tier industrial firms in these countries, thanks to the then-prevalent practices of “vertical integration” and multi-sourcing of components. The practical result was there were always many sources for any particular component, be it a piston ring or a semiconductor. This in turn meant that although a shock in any one place might disrupt a single lead firm, the effects would rarely spread beyond that particular firm into any larger system.

This was equally true of most of the large multinational industrial enterprises of the era. When firms like IBM or Toyota expanded production into a new region, they tended to build fully integrated industrial operations within that region. Expertise and ideas flowed across borders; components and other inputs traveled more limited circuits.

In the past generation, however, two revolutions in industrial and political organization have driven the concentration of capacity that is the root cause of these crashes. The first of these was the consolidation, or “rationalization,” of production by private industrial corporations.

Here the story can be traced largely to 1981 and the Reagan administration’s radical remaking of antimonopoly law in the United States. In the industrial sphere, traditional antitrust enforcement had aimed to ensure that at least three or four firms competed to provide any particular product, like aluminum or televisions. The new rules, by contrast, left managers at industrial corporations free to consolidate, often to the point of complete monopoly, as long as they could make a rudimentary case that doing so served the “welfare” of the “consumer.”

At first, only a few corporate managers fully understood the license that they had been given. Most notable was General Electric CEO Jack Welch, who within months announced plans to reorganize that immense conglomerate-based on a new (or, rather, rediscovered) philosophy of duopoly. It was not until the 1990s that the process of

radical consolidation really took off, first in the electronics sector, then in the automotive and other industries.

Although the public tends to focus mainly on consolidation at the level of the lead (or branded) firm, some of the most dramatic consolidation took place down inside the supply base.

At many top-tier industrial firms, for instance, managers came to view the changes in antitrust enforcement as an opportunity to pool or communalize their production of components with their “competitors.” Many managers began to abandon the strategy of vertical integration of production and to restructure their firms more as traditional trading companies designed to combine components and services provided by outside vendors. In the automotive industry in particular, this resulted in General Motors and Ford “spinning off” their Delphi and Visteon parts units, with the expectation that these giant suppliers would then do business with all the lead firms.

Individual investors and fund managers, by contrast, tended to view the radical changes in antitrust as a de facto license to monopolize some activity or other *within* the supply base. Investors including David Stockman and Wilbur Ross used firms like Collins & Aikman and Lear Corporation to roll up power over individual activities within the chain of production, such as the manufacture of dashboards or windshield wipers. The ultimate goal of such players was to take advantage of this de-integration of the giant industrial firms to consolidate sufficient power over some few production activities to dictate terms up to the lead firms.

The practical result of this combination of outsourcing of production by lead firms and of the rolling up of the supplier base by a different set of players was the reorganization of entire industries into what are, for all intents and purposes, single tightly integrated systems, structured much like a Hydra. The individual consumer may still see many different branded firms offering a particular type of sedan or laptop, but all these competing heads increasingly sprout from a single shared body of suppliers.

In time, this radical inversion of U.S. competition law—and in the industrial organization of U.S.-based companies—led industrial man-

agers in other countries to adopt similar strategies. One of the more dramatic changes took place in Japan.

During the U.S. occupation, Japanese industry was reorganized into sprawling conglomerates structured around a central banking operation and trading house. But Japan's postwar competition policy—designed largely by the New Deal-era American reformers who wrote Japan's occupation-era constitution—also ensured that many of these *keiretsu* replicated one another's work and competed with one another. The overarching result was to ensure that usually at least four Japanese companies were engaged in any particular manufacturing activity. In many instances, competition in Japan was actually more robust than in the United States. In the case of automobiles, for instance, while the United States relied on four main manufacturers, Japan boasted of nine.

Japanese officials began to loosen the nation's competition laws about a decade ago. One reason, they said, was to enable bureaucrats in Tokyo to keep better track of technologies already dominated by Japanese firms in order to protect them from competitors abroad, especially in China and South Korea. Another reason, the officials said, was to free up Japanese industrialists to capture the same sorts of efficiencies their American competitors seemed to be utilizing in the late 1990s and early 2000s.

One way to comprehend how this radical remaking of competition law affected the physical structure of the production system—hence the nature of risk in the system—is to compare two industrial shutdowns in Japan, both of which involved the loss of production of a single inexpensive component.

The first shutdown dates to February 1997, when a fire at the Aisin Seiki plant in Kariya destroyed machinery used to build proportioning valves for the rear brakes of Toyota automobiles. In the years leading up to the fire, Toyota had pioneered a practice of “lean” production, which includes reliance on single sources of supply and the holding of almost no inventory (sometimes called “just-in-time” manufacturing). Hence, within a matter of hours a shortage of p-valves forced Toyota to close its entire main production operation in nearby Toyota City.

By the time Toyota's employees fully restored production of p-valves more than a week later, Toyota had suffered a huge hit, with production falling some 70,000 vehicles below projections. Yet after a close review of the event, Toyota managers opted not to alter their production practices. They concluded that the savings derived from eliminating second plants and warehouse operations more than outweighed the near-term losses caused by the shutdown. Indeed, the company swiftly made up the shortfall in production through overtime.

For our purposes, the key fact revealed by the fire was that even though Toyota's managers had organized their firm into a single, tightly integrated system, the company as a whole remained largely disconnected—physically—from Japan's other vehicle manufacturers. At the time, Toyota and its main competitors generally refused to share suppliers with one another. Hence the fire at Aisin did not affect the operations of Nissan, Honda, Mazda, or any other large vehicle manufacturer in Japan. On the contrary, these firms all stood ready to assist Toyota in its recovery, if called upon.

The second shutdown took place almost exactly a decade after the Aisin fire and some five years after Japan's government relaxed its antimonopoly policies in response to the American example. In this instance, a relatively modest magnitude 6.6 earthquake off the coast of Niigata, Japan, in July 2007 shattered the operations of a small industrial firm named Riken, which specializes in the production of piston rings.

Once again Toyota was forced to shutter its Japanese production operations within a matter of hours. This time, however, the disaster also triggered the almost immediate shutdown of eleven other major automotive and truck companies, including Honda and Nissan. The reason was simple—all twelve had opted to rely on a single company for the supply of this \$3 part and, indeed, on a single small complex of factories.¹

Comparing the disruptions caused by the Aisin fire and the Niigata earthquake also helps clarify the role played by just-in-time practices specifically and "lean" manufacturing techniques more generally. After the tsunami, and again after the flooding in Thailand, reporters

and economists repeatedly identified just-in-time production as the main source of the structural fragility revealed by the disasters.

The trouble with this line of thinking is that by the time of the 1997 fire, Toyota clearly had already fully adopted such just-in-time and lean production practices. Toyota was, in fact, the world's pioneer in these practices. Yet the disruption from that fire was limited only to Toyota's own system and did not affect that of any other carmaker. What changed in the decade between the Aisin fire and the Niigata quake is not that production systems became faster or that inventory was more stripped out. What changed is that the capacity to produce components became far more concentrated.

A Hegemon Retreats

The second act that revolutionized the organization of industrial capacity was the set of political decisions by industrialized nation-states that resulted in the blending together of their production systems in the process we have come to know as "globalization."

Here the key political decisions—the erection of the World Trade Organization (WTO) and the almost complete liberalization of trade between the United States and China—trace to the early days of the Clinton administration. Much as the Reagan administration's 1981 suspension of antitrust law unleashed the domestic monopolist, these early 1990s decisions gave the foreign mercantilists *de facto* license to capture and command what industrial capacity they would.

It is important to be clear—extreme industrial interdependence among nation states did not begin in the 1990s but, rather, dates to the early post-World War II period. The European Coal and Steel Community of 1950—the germ of today's European Union—aimed to integrate these two industries into a single border-crossing system controlled by six countries. The foremost goal was not economic efficiency but a rudimentary political integration, both to prevent another war between France and Germany and to fortify the anti-Soviet alliance. In the early 1950s the U.S. government began to actively cede portions of the U.S. consumer and military markets for certain

industrial goods to Japanese manufacturers. Here, too, the intent was not economic efficiency foremost, but to tie the two countries more tightly together politically, again for strategic reasons.

What changed in the mid-1990s was who managed the cross-border industrial systems that resulted from such strategic integration of national economies. Through the end of the cold war, the main actor was the nation-state, and the primary goal was to promote the political and economic security of individual nation-states, and of the system as a whole. These countries—led more or less directly by Washington—used a variety of tools to study and manipulate the cross-border industrial systems. One product of this hands-on management was a reasonably fair and safe distribution of production capacity among these peoples.

Under the WTO regime, by contrast, Washington for all intents outsourced the power to manage these international industrial systems from our democratically controlled state to the managers of the industrial and trading corporations, and to the people who direct those managers. In the case of firms governed by U.S. law, the main goal became to manage these systems to maximize profit, if necessary by taking U.S.-based industrial capacity and technology and transferring them to foreign control. In the case of firms based in more traditionally mercantilist nations, the main goal often became to seize industrial capacity and technology—often within the United States—and transfer them to the home country.

The most dramatic physical result of this revolution in how we manage trade was a rapid concentration of erstwhile U.S. industrial capacity in offshore enclaves.

To understand the practical effect of this radical change in the governance of the international trading system on the physical structure of that system, consider first a classic example of how cold war-era Washington responded to a strategic thrust by a mercantilist state. In that case the foreign mercantilist state was Japan, the industry was computers, and the time was the mid-1980s.

The story here began with IBM's decision in 1981 to open its personal computer technology to outside suppliers. At the time IBM

was the target of an active antitrust suit, having been charged with using illegal means to protect its commanding position within the U.S. computer industry. By opening the business of manufacturing personal computers to outside suppliers, IBM aimed to move swiftly into a booming market, without further exposing itself to government action.

In the event, IBM's strategy yielded mixed results, for the company and the industry as a whole. In the case of Microsoft and Intel, IBM managed merely to transfer its own monopoly power to other firms. In the production of many other components, however, ranging from hard drives to DRAMs, IBM's strategy resulted in an explosion of new entrants and a burst of competition.

This initial period of ferment soon began to give way to more consolidated control, albeit not by any one private firm so much as by the Japanese state. By 1985, firms like NEC and Fujitsu, more or less openly backed by the country's powerful Ministry of International Trade and Industry, had captured commanding positions in the production of DRAM and EPROM (erasable programmable read-only memory) chips, among other components. Japan's share of the worldwide market for DRAMs hit 75 percent in 1986. American firms, meanwhile, which had controlled 70 percent of the world market in 1978, had seen their share of the market plummet to only 20 percent.

Over the next two years, the Reagan administration responded with a series of strict quotas and tariffs and with a robust investment in a new semiconductor consortium named Sematech. Yet the Reagan administration did not pressure semiconductor "consumers" like Tandem and Hewlett Packard to limit their purchases to U.S. sources of supply.

In combination, these actions did not result in a traditional "protectionist" regime, in which the aim is to build a tariff wall around existing or future industrial capacity. Rather, they served to set a limit on how much of any particular industrial activity could be concentrated in one nation-state—in this case Japan. The actions resulted in return of some production to the United States. They also resulted in the shift of much production from Japan to third-party countries, including South Korea, Taiwan, and Germany.

The de facto sovereign of the postwar system, the United States, in other words, used power not to build up its own economy in a traditional mercantilist manner, at the expense of lesser powers. Instead it used power in ways that made the larger system itself more international, more competitive, more open, and more resilient.

Following the introduction of the WTO system in the mid-1990s, however, it did not take the leaders of mercantilist countries long to realize they were now largely free to concentrate industrial capacity—and corresponding political power—pretty much as they pleased. The original hegemon of the international industrial system no longer intended to police the system, which meant no coherent power stood in their way.

One of the most dramatic efforts to concentrate industrial capacity was launched by the government of Taiwan. In partnership with two private firms, TSMC and UMC, Taipei directed the construction of extremely large semiconductor foundries designed to manufacture chips designed by other firms. By the late 1990s, this brute application of capital had paid off in the capture of a dominant position in the manufacture of certain highly specialized semiconductors. Production of these chips—which theretofore had been dispersed among more than twenty different vertically integrated firms around the world—was increasingly concentrated not merely in Taiwan but in a single city, Hsinchu.

In the years since the Clinton administration dismantled the cold war-era institutions the American people had used to ensure the fair and safe distribution of power within the international system, hundreds of firms have made similar mercantilist plays to capture control over the capacity to produce some one component or another. Much of the recent history of industrial Asia, in fact, can be viewed as an intercountry competition to control at least a few key links in each major global chain of production. South Korea, for instance, has captured control of some 60 percent of large liquid crystal display (LCD) screens. Taiwan, meanwhile, managed to capture almost 60 percent of small and medium-size LCDs. One of most dramatic recent actions has been China's play to wipe out the U.S. manufacturers of photo-

voltaic panels and thereby to capture control over those industrial capacities and arts.

Such mercantilist nation-states do not work only with locally flagged corporations. As the U.S. government proved repeatedly during the cold war, a hegemon with a strategic vision can apply power to industrial and trading corporations based in other countries in ways that lead these institutions to serve the hegemon's larger purposes. Today we increasingly see Beijing putting U.S. flag firms to such strategic use, as when it pressures companies like General Electric and Intel to transfer key technologies to Chinese state companies.

Over time, the efforts by these mercantilists to concentrate control and capacity came to affect the physical stability of the international industrial system in much same way that domestic monopolists like Wilbur Ross or the backers of Riken affected the industrial systems of the United States and Japan—only on a far grander scale. Here again, one way to comprehend the new nature of risk within these international systems is to compare two discrete events, both of which also took place in Japan, the Kobe earthquake of 1995 and the Tohoku earthquake and tsunami of 2011.

In the first month after the disaster in Kobe, in the heart of Japan's intensely industrialized south, domestic production fell by 3 percent, and international effects were minimal. After the 2011 tsunami, by contrast, Japan's industrial output fell an astounding 15.3 percent, almost double the previous record fall, after the panic of 2008. Most surprising was how big a fall—13.5 percent—was registered outside the disaster zone.

Around the world, meanwhile, the drop-off in production after the Tohoku disaster was sudden, dramatic, and widespread. Countries as diverse as South Korea, China, the Philippines, Taiwan, Singapore, Thailand, Germany, France, and the UK all reported closely interlinked plunges in production. In the United States, Goldman Sachs estimated that the industrial disruptions cut annualized growth in the gross domestic product (GDP) in the second quarter by a full percentage point. The Federal Reserve reported record downturns in production; the Philadelphia Fed Manufacturing Index, for instance, registered the biggest three-month collapse ever.

The disruptions extended across a remarkably wide array of industrial activities, including personal computers, mobile telephones, electronics, appliances, robotics, telecommunications gear, specialty steel, photovoltaics, and chemicals. The world automotive industry alone saw production plummet some 30 percent, for more than three months.

More prosaically, this one local disaster in Japan cost tens if not hundreds of thousands of people around the world their jobs, at least temporarily. It resulted in higher prices for innumerable manufactured items for hundreds of millions of people, around the world.

And the root cause of this cascading collapse? As in the event at Niigata in 2007, we see the effect of radical concentration of capacity within Japan under the direction of private monopolists. In perhaps the most striking instance, beginning in 2003, Hitachi, Mitsubishi Electric, and NEC Electronics merged their capacity to produce automobile microcontrollers into a single keystone facility, run by a company named Renesas. What we also see is the effect of far more intimate merging of industrial systems within and among countries. At the time of the quake, for instance, this same one microcontroller factory run by Renesas was being used to serve plants not merely across Japan but around the world.

We see the effects, in other words, of the near-complete absence of any strategically coherent effort by any industrialized country (with the partial exception of China) to prevent foreign mercantilists from making their people extremely or entirely dependent on foreign sources of supply for key products. And we see the effects of the complete failure of the generation that conceived of the WTO to charge any other entity—private or public—with the task of ensuring a safe and stable distribution of production capacity.

And so the monopolist and mercantilist were left free to concentrate control over keystone production activities. In the process they often also concentrated capacity in whatever way they alone saw fit, hence concentrated risk within the industrial system to degrees we have never before seen in our world.

Eyes Wide Shut

The idea of the industrial crash is not new. In World War II, the U.S. government initially viewed heavy bombers not as weapons of terror but as a way to paralyze enemy industry by striking at the manufacture of keystone components and inputs. The most famous such attack targeted the ball-bearing plants in Schweinfurt, Germany, in 1943. In the event, the bombing resulted in widespread disruption to Germany's industrial system. But the results were ultimately limited by the small size of the U.S. bomber fleet at this early stage in the war, and by subsequent German decisions to disperse production far more widely.

Given such a history, the obvious question is, how did no one notice the fact that our industrial system today was fast being reorganized into a complex network of bottlenecks or, rather, of potential Schweinfurts? Despite repeated proofs that our industrial system was fast becoming radically unstable, due to the emergence of numerous single points of failure, how was it that no one spoke against the further rationalization of the system?

Or for that matter, in a country where political leaders speak every day of the need to reduce our dependence on foreign sources of energy, to ensure our country's "security," how is it that no U.S. political or industrial leader noticed that domestic monopolists and foreign mercantilists were together restructuring our industrial systems in ways that radically empowered both the offshore autocrat and the offshore terrorist?

In the decade since I first began to study this industrial revolution, I have identified at least four separate factors that, in combination, appear to have prevented political and industrial leaders in the United States and elsewhere not merely from reacting to these threats but even from noticing them in the first place. Of these factors, two affect how our public government and private corporate governments process information. The other two affect how the ruling elites in the United States and Europe interpret evidence of fragility when it is placed before them.

The first factor was the complete failure of the Clinton and Bush

administrations to update the institutions of the U.S. state to account for the revolutionary overhaul of the trading system at the end of the cold war. At a time when the United States voluntarily opened its borders to a degree entirely unprecedented in its history, these two administrations did not even attempt to establish a single new agency or practice—at home or in the international arena—to understand how the new system actually functioned. As a result, the American people were left with no ability to protect either their industrial security or their sovereignty or to ensure the stability of the international system itself.

The second factor is a natural, although poorly understood, result of the communalization of risk that takes place when we communalize capacity. Back when most large industrial firms were vertically integrated, the cost of an industrial shutdown affected mainly the immediate institution. Management teams, therefore, devoted a lot of effort to ensuring the stability of supply systems. In cases where all competitors rely more or less equally on the same supplier, however, managers no longer see supply chain risks as *competitive* risks. A good example of how this plays out was captured by a *Financial Times* reporter after the tsunamis in Japan. The reporter asked an executive of a U.S. business what would happen to his firm if a similar shock hit Guangdong, the world's most concentrated center of electronics production and home to one of the company's two main factories. The executive made clear that the firm's production would be shut down. But this disastrous outcome would be balanced out by the fact "that all our competitors would be in the same position" (Marsh 2011).

The third factor limiting our ability to understand the dangers posed by this revolution in our production systems is our dependence, as a society, on economists to make sense of what takes place in our political economy and industrial systems. We now are well aware of the failure of most members of the academy to understand the structural risks in our international financial systems during the lead-up to the crash of Lehman Brothers in 2008. Economists are, if anything, even less capable of understanding the structural risks within our international industrial systems. Indeed, most economists

have essentially been trained to look favorably on exactly the sort of extreme concentration of capacity that poses such a fundamental threat. The central metaphor on the first page of the book that serves as the foundation of classical economics, Adam Smith's *Wealth of Nations*, after all, celebrates the same sort of specialization of labor we now see manifested in our "globalized" production systems. In the 235 years since the publication of that book, however, the academy has never effectively addressed intellectually the idea that there might be some practical limit to such specialization.²

The fourth factor is the rise of what we can call global "utopianism." Not everyone, in fact, has missed the revolutionary nature of the restructuring of our industrial systems. Corporate leaders including the former CEO of Intel, Andy Grove, and the former CEO of Xilinx, Wim Roelandt, for instance, have publicly warned of the potentially catastrophic nature of any major disruption to these systems.

The question, of course, is how to interpret this transcendent fact. Rather than focus on the growing fragility of our industrial systems, our global utopians have chosen instead to sing of a dawning new age in which such extreme industrial interdependence serves to all but guarantee peace and prosperity among peoples.

The basic argument of these utopians is that if country A makes all of component A, and country B makes all of component B, and country C makes all of component C, this compels the citizens of these three countries to work in harness with one another, day after day, to ensure that the industrial goods required by the peoples of all three countries are actually produced. No rational actor will ever, so this line of thinking goes, disrupt such a delicately balanced, communally held system.

Chief among these utopians is *New York Times* columnist Thomas Friedman, in his book *The World Is Flat* (Farrar, Straus and Giroux, 2005) and military "strategist" Thomas P.M. Barnett, whose book *The Pentagon's New Map* (Putnam, 2004) was highly influential in the Defense Department under Secretary Donald Rumsfeld. Friedman even conjured up what he called the "Dell theory of conflict prevention," which holds that "no two countries that are both part of a major global

supply chain . . . will ever fight a war against each other.”

Although Friedman, Barnett, and their fellow global utopians surely mean well, there are innumerable problems with their reasoning. First and most obvious is that rational actors are not always in a position to ensure the proper functioning of these systems—as for instance when a natural or financial disaster strikes. Second, as discussed earlier, we can imagine many sorts of rational actors—ranging from terrorists to labor unions to opposition parties—who might seek to promote their causes precisely through the disruption of these systems.

And if there is any doubt that the leaders of a sovereign state might reasonably decide to seek to exploit such a dependency to achieve some political end, we need but remind ourselves of the Eisenhower administration’s 1956 threat to crash the British pound and cut off the flow of oil to Western Europe, in what proved to be an ultimately successful effort to reverse a British, French, and Israeli invasion of Nasser-era Egypt.

If anything, the mere existence of such dependencies may actually serve to tempt a nation-state to acts of aggression it would not otherwise contemplate.

Despite such massive flaws, however, the theories of these global utopians have resulted in truly outsize political effects. Most dangerously, many members of the American elite in recent years have appeared eager to shut down any honest critique of these fatal structural flaws within the system, apparently out of fear that merely to recognize the dangers might somehow trigger the very act of aggression, and cascading collapse, we all most fear.

As We Wake

With a problem of this scope and complexity, it would be rank foolishness for any one person (or for that matter, any select few people) to attempt to design a comprehensive solution. The following is, therefore, little more than an effort to highlight a few fundamental facts that we would be wise to keep in mind, as we awaken to this entirely unprecedented danger.

First, the fundamental problem is not bad economics but bad engineering. We build circuit breakers into electrical systems, bulkheads into ships, and levees into river valley landscapes. Yet when we reorganized our industrial system, we ended up with a complex, cross-border network of single points of failure, hence with no ability to compartmentalize shock. We should thus understand our central challenge to be to reengineer the system, as a whole, to be resilient.

Second, this bad engineering is the result of bad law. No technology, no mechanical market mechanism, and no metaphysical impulse toward “globalization” determined this outcome. Rather it is the result of political decisions, by the Reagan and Clinton administrations, to let the monopolist and the mercantilist out of the boxes where we put them more than two centuries ago. These monopolists and the mercantilists, in the act of concentrating power over some activity, have also often concentrated capacity and thereby risk.

Third, the private sector has ample strategies and tools to organize these systems safely, as indeed they did so in the past. Modern information and production technologies make it easier than ever to do so now, and some firms still pursue such strategies.³ The only thing the private sector lacks is a clear and fair set of rules designed to force all industrial managers to use these tools.

Fourth, the public has all the strategies and tools we need to force managers of private enterprises to act to ensure the stability and resiliency of the industrial systems on which we all depend. The only thing we lack is a strategic vision to guide our modernization of existing bodies of antimonopoly and trade law.

Fifth, this reorganization will pay for itself. Almost any action designed to make the international production system more stable and resilient will also make the system more competitive and open to new ideas.

Sixth, this reorganization gives us an immense opportunity to get globalization right. The problem with our present global system is that it is far too tightly bound because capacity has been too concentrated. If we distribute capacity more widely in order to make the system more

resilient, we also open the system in ways that enable more people to engage in peaceful and productive commerce.

All we really lack—at least for now—is the strength to admit we were duped, and that we did something fantastically stupid. Of course, if we look across the Atlantic to that other utopian project, the euro, we can at least take some comfort in the idea that in this we were not alone.

Notes

1. A large number of U.S.-based assembly operations also depended on this same factory complex. They were buffered from the disaster by the fact that Riken shipped its piston rings by sea, a process that takes two to three weeks.

2. The good news here is that the cascading disruptions caused by the Lehman crash and the tsunamis appear to have resulted in a new awareness—in institutions including the Federal Reserve and the World Trade Organization (WTO)—of the physical fragility of these systems. One WTO economist, for instance, wrote recently that “global production networks” (GPNs) have introduced “new microeconomic dimensions that run parallel to the traditional macroeconomic mechanism of shock transmission.” He went on to conclude that these GPNs have an “inherent magnification effect” on shocks.

3. Acme Alliance, a Chicago-based maker of castings for the vehicle industry, operates factories in Chicago, Brazil, and Shenzhen, China. Each plant is, according to the *Financial Times*, “largely autonomous and capable of supplying components to other parts of business in case of a disruption.”

For Further Reading

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