

The Global Battle Over Advanced Industries

BY ROBERT D. ATKINSON

*It's time for
a more nuanced,
more sophisticated
U.S. approach.*

While the Trump and Biden administrations have abandoned America's long-standing mission of promoting global market opening, they've both retained the long-standing mindset that "all exports are equally good." Indeed, since its inception, the office of the United States Trade Representative has remained largely indifferent on the relative priority of opening markets for corn or cars. All foreign trade barriers are seen as equally bad; all exports are equally good.

Shaped by the neoclassical economic view that no industry is more important than any other, U.S. trade policy is woefully out of step with the fierce competition over advanced technology that is at the heart of today's global economy. This is not because it is too consumer- or worker-centric, but because it is strategically obtuse. If the United States is to win the technoeconomic battle instigated by China, trade policy must prioritize global market access for high-fixed-cost advanced industries such as aerospace, pharmaceuticals, semiconductors, and software.

This needed shift is particularly challenging as the Biden administration has turned away from trade, or at least taken a "time out." The administration's official statements champion trade "that encourages a race to the top" and "worker-oriented" trade policy, but its actions suggest its real goal is to limit America's global economic entanglement. Case in point: it has done

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very little if anything to craft new trade agreements with other nations, even “easy” agreements with allies such as the United Kingdom. If only the U.S. economy was more self-sufficient, the thinking of the globalization skeptics goes, there would be little pressure to have a good U.S. business climate. If only trade agreements could force U.S. labor, environmental, and tax standards on other nations, then U.S. tax and regulatory policy could operate unhindered. We could regain the utopia of the 1950s when there was little foreign competition, which enabled high corporate taxes, high unionization, and high wages. The administration rejects, or at least wants to get past, *New York Times* columnist Thomas Friedman’s notion that globalization brings with it “golden handcuffs” that pressure countries into having pro-market policies. For them, global economic competition is the major barrier to achieving their goal of a pro-worker paradise.

To be sure, this vision is appealing given China’s accession to the World Trade Organization, the loss of so many U.S. manufacturing jobs over the last two decades, and the decline in private sector unionization. But while an inward-oriented trade agenda would lead to reshoring of some industries, it would also come at the cost of losing America’s leadership in many if not most advanced-technology industries, which are central to U.S. technological power *vis-à-vis* China. The reason is simple: While many traded-sector industries can succeed with the U.S. market alone, virtually all advanced industries need

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global trade and open markets. By abandoning that goal, the Biden administration is consigning America’s technology industries to a slow decline.

To avoid that fate, Congress and the Biden administration need to develop a new approach to trade policy aligned with an overall advanced-industry strategy. This would mean basing trade policy on a more sophisticated approach to industries and competitiveness, one that rejects

the simple-minded “Ricardoism,” the economic theory that holds any exports must be based on U.S. comparative advantage, and therefore they must be in the national economic interest. While this simple model might hold for low-wage, natural-resource economies (such as economist David Ricardo’s example of wine from Portugal), it was never true for advanced industrial economies where competitive advantage is shaped, earned, and gained, not revealed. There is no natural reason why Germany is good at producing machine tools, Taiwan leads in semiconductors, and China dominates solar panels and batteries. All three reflect policy choices (in the latter example, for instance, China’s \$42 billion in subsidies for its solar panel sector in 2012 and 2013 alone). As such, U.S. trade policy needs to be grounded in an understanding that some industries (such as computer chips) are more important than others (such as potato chips) and that the former require much larger markets than the latter.

FOUR FACTORS TO GUIDE TRADE POLICY

A more strategic trade policy designed to shift the U.S. industrial mix toward higher-value-added advanced sectors critical to competing with China needs to be based on four structural industry factors:

■ **Industry wage level.** As a rule, trade policy should not seek to protect low-wage sectors against competition from low-wage nations.

■ **The degree to which the industry is inherently domestic.** Some industries are resource-based (for example, lumber and wood products are located near forests). Others have high transportation costs (such as soft drinks and cement) and are unlikely to be shipped extremely long distances. Trade policy need not prioritize these sectors.

■ **The degree to which the industry is natural resource-based where production is influenced by domestic natural resources** (such as ranch land and cattle, rich crop land and soybeans, oil basins and oil). While global market reach enables expanded output in these industries, it is not vital because they would still be competitive if their markets were solely in the United States. Trade policy need not prioritize these sectors unless they face foreign predation, like China’s trade aggression with rare earth minerals.

■ **Most important is the degree to which an industry has high or low fixed costs.** A key characteristic of innovation-based industries is that they must incur very high fixed costs before they can produce the first item for sale. As such, the average cost of a product significantly exceeds its marginal cost. The software industry presents an extreme case. It can cost hundreds of millions

of dollars to produce the first copy, but additional software can be produced at virtually no cost. Likewise, it can cost more than \$2.5 billion to bring a drug to market, but the actual cost to produce a single dose is much smaller.

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Boeing invested more than \$15 billion before a single 787 Dreamliner was sold. It can cost \$100–\$200 million to make a movie. Economists describe such industries as experiencing increasing returns to scale, meaning that each additional unit sold yields a higher rate of profit because costs decline. Such high-fixed-cost industries are usually technology-intensive.

WHY FIXED COSTS MATTER

Let’s examine a hypothetical example of the cost structure of an industry where fixed costs are twenty times marginal costs—\$1,000 and \$50, respectively. In other words, the company must invest \$1,000 in research and development, design, machinery, and other fixed costs before it can produce its first product unit. The company must then pay \$50 for energy, materials, and labor to make each unit. If the company can charge \$70 per unit based on market conditions, then because of its high fixed costs, the company will lose money until it sells more than fifty units. At that point, it will make an increasing profit on each additional unit it sells. For these high-fixed-cost industries, scale is everything. Imagine, because of trade restrictions, the size of the market is just seventy-five units. Assuming the company must invest 10 percent of revenue in ongoing research and development to stay competitive, it will lose \$25. However, if the market size increases to one hundred units through trade, then the company would make a profit of \$300,

and its per-unit profits would increase from -0.48 percent to 4.29 percent.

Moreover, in high-fixed-cost industries, scale lowers costs. If the firm can sell only seventy-five units in the domestic economy, the total cost to make the seventy-fifth unit is \$63.33, whereas if it can sell one hundred units globally, the cost falls to \$60.00. This is why scale is so critical for high-fixed-cost industries, and why if America wants to retain advanced-industry competitiveness, government must do all it can to maximize the available market. Doing so allows U.S. firms to sell products at a more competitive price and to maximize research and development investments to stay competitive in future product cycles. Given that every advanced U.S. industry is in stiff competition with China, the critical factor for success is which country captures the marginal new sales. If U.S. trade policy is not pushing for market-opening for these sectors, then the industries will fail to gain needed scale, and ultimately lose to China, which, in contrast to the United States, is aggressively pushing for market-opening and Chinese high-fixed-cost industry dominance. Likewise, for all the challenges Europe’s innovation economy faces, the European Union has been much more assertive in pursuing free trade agreements with its trading partners around the world. It has forty-one free trade agreements with seventy-two

Table 1: Top Ten U.S. manufacturing industries with the lowest production-worker costs as a share of total compensation costs, 2017

Sector	Share
Semiconductor Machinery Manufacturing	17%
Ammunition (Except Small Arms) Manufacturing	18%
Electronic Computer Manufacturing	20%
Search, Detection, Navigation, Guidance, Aeronautical, and Nautical System and Instrument Manufacturing	21%
Analytical Laboratory Instrument Manufacturing	24%
Computer Storage Device Manufacturing	24%
Electromedical and Electrotherapeutic Apparatus Manufacturing	24%
Automatic Environmental Control Manufacturing for Residential, Commercial, and Appliance Use	26%
Irradiation Apparatus Manufacturing	26%
Instrument Manufacturing for Measuring and Testing Electricity and Electrical Systems	27%

Source: U.S. Census Bureau, Census of Manufacturers, 2022

countries, while the United States only has fourteen free trade agreements with twenty countries.

The U.S. government does not measure the extent to which industries differ in terms of fixed and marginal costs. However, one way to estimate is to assess the ratio of production wages to total wages. Industries that have lower fixed-to-marginal cost ratios generally have a higher share of production workers. Industries that employ more nonproduction workers in activities such as research and development, design, and marketing tend to have higher fixed costs.

Using U.S. Census data on manufacturing, the Information Technology and Innovation Foundation has ranked 364 manufacturing industries this way. Table 1 shows the top ten industries based on having the lowest production worker compensation as a share of total compensation in 2017. For example, just 17 percent of total labor costs in the semiconductor machinery manufacturing industry are for production workers, while a significant

share of the rest goes to engineers and scientists. What is striking is that most of the top forty or fifty high-fixed-cost industries are advanced industries where the United States must maintain strength if it is going to avoid losing to China, including semiconductors, computers, instruments, and communications equipment.

In contrast, more traditional industries have very different cost structures in which fixed costs are not much higher than marginal costs. In a hypothetical case, if a company has \$50 in research and development, design, and other fixed costs before it can produce its first unit, and it has another \$50 in marginal costs for energy, materials, and labor to make each unit, then it only needs to sell three units before it starts making a profit. Imagine if, because of trade restrictions, the size of the market is limited to seventy-five units. The total cost of the seventy-fifth unit would be \$50.67. If trade policy opens foreign markets and the company can now sell one hundred units, then marginal profits increase by less than 1 percent, while the cost of the one-hundredth unit would fall just

16 cents to \$50.50. In other words, even if the firm had 100 percent of the global market, its cost reduction and additional profit would be modest. In these industries, the U.S. domestic market is usually more than adequate for them to maximize productivity and competitiveness with foreign companies.

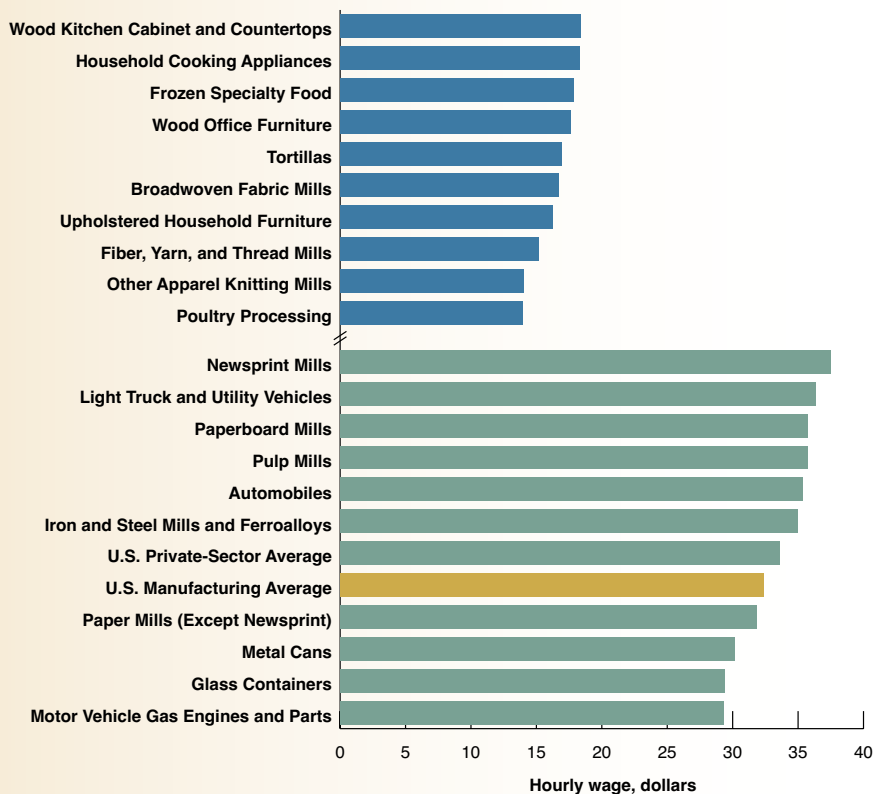
Low-fixed-cost industries differ more by wage level. Figure 1 shows the ten lowest average hourly wages among the sixty lowest-ranking industries that don't focus on natural resources, based their ratios of production-worker compensation to total compensation. All are traditional lower-wage manufacturing, such as furniture and apparel.

Figure 1 also lists the top ten hourly wages among the same group of sixty low-fixed-cost industries. These include automobile and part production, metal can manufacture, and paper and pulp mills.

COST STRUCTURE MATTERS

The Biden administration's conceptual model of trade—whether intentionally or unintentionally—favors low-fixed-cost industries for which the U.S. market alone is adequate

Figure 1 Ten highest and lowest hourly wage rates among sixty low-fixed-cost U.S. manufacturing industries, 2023*



*Not including natural-resource industries such as plywood.

Source: U.S. Bureau of Labor Statistics

for industry success. In their case, domestic trade policies like Buy America provisions and tariffs, coupled with limited to non-existent foreign market-opening, are not all that deleterious to industry competitiveness and cost structure.

China rejects the notion that trade is always win-win and understands that competition in high-fixed-cost industries is almost always win-lose.

Expanding their markets would not usually lead to significant increases in profit rates or reductions in costs. But while this is true for most if not all low-fixed-cost industries, it is not true for high-fixed-cost industries.

But even within low-fixed-cost industries, it makes sense to differentiate. It makes no sense for low-wage low-fixed-cost industries because, with its high labor costs, the United States has little competitive position in these industries. For these industries, the United States should fully embrace free trade. Here, Ricardian trade theory works: Low-wage countries should specialize in lower-wage, low-fixed-cost industries and in turn import higher-wage goods and services from the United States. Moreover, for the most part, these low-fixed-cost sectors are not strategically important to the U.S.-China competition. As such, U.S. trade policy should enable global division of labor in these industries by embracing more market-opening steps with lower-income nations. The key role of policy in these sectors is to help affected workers and communities adjust.

For high-wage low-fixed-cost industries, some protectionism (such as tariffs) and an assured domestic market (for example, Buy America), might be needed, or at least will be less harmful than applying these policies to high-fixed-cost industries. Some protectionism and leveling of playing fields may be needed, especially because the U.S. trade deficit accounts for 75 percent of the global trade deficit among deficit-running countries. And because the United States is at a competitive disadvantage due to the structurally overvalued dollar coupled with the lack of a border-adjustable value-added tax and the requirement that companies, rather than government, pay for health insurance, costs are higher for these industries in the United States. But if protection for

high-wage sectors is to be used, it should be narrowly applied to final-goods industries (like cars) where principally consumers pay the higher costs. The problem with applying tariffs to intermediate goods, such as steel or computer chips, is that they raise prices for domestic final-goods producers, making them less competitive.

Finally, for high-fixed-cost industries, trade policy needs to push for the maximum possible global market size. This is because each additional sale generates more profits than the prior one and lowers unit costs. That added revenue leads to reinvestment in a virtuous circle, and the lower prices help U.S. companies compete with their foreign competitors, both of which are critical to staying ahead of Chinese rivals.

Ensuring the largest possible markets for high-fixed-cost industries requires a new U.S. trade policy: neither the old “free trade” model, nor the current one in which America sits on the sidelines while most other countries move forward with trade liberalization and China puts in place the Regional Comprehensive Economic Partnership and other such agreements. A focal point for U.S. trade policy should be to insist that other nations open their markets for U.S. goods and services in high-fixed-cost industries. If they do not, then the United States should reduce their access to U.S. markets.

As in the older kind of free trade model, this entails signing “easy” bilateral agreements, like one with the United Kingdom, which should be a priority for the Biden administration. But it also means embracing and advancing sector-specific agreements like the Information Technology Agreement, which eliminates tariffs on trade in certain information technology goods and is ripe for a third round. It means pushing back against other nations’ data localization

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efforts. And most importantly, it means taking the lead to establish an overarching agreement among like-minded Pacific and Atlantic nations that commits to free trade on both low-wage, low-fixed-cost industries and high-wage high-fixed-cost industries. Doing so will create much-needed, much

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larger allied markets where allied high-fixed-cost companies can export and compete. It also will create leverage for low-wage nations to open their markets to high-fixed-cost exports. A global “like-minded” market would also go a long way toward addressing growing national security and economic concerns about advanced-technology industries and associated supply chains.

But there is one more key step that U.S. trade policy needs to embrace if America is to win in high-fixed-cost industries: limiting sales of Chinese firms in high-fixed-cost industries. As noted, large markets enable high-fixed-cost firms to sell more, but if larger markets come with more competitors, sales per firm can fall. This does not mean that market-generated competition is detrimental. Normally, markets will not produce an excess number of competitors. But through massive subsidies, discriminatory government procurement, closed markets, and other predatory policies, Chinese high-fixed-cost industries gain market share they normally would not have at the expense of allied high-fixed-cost firms. China rejects the notion that trade is always win-win and understands that competition in high-fixed-cost industries is almost always win-lose. Every sale of a single-aisle passenger jet that China’s state-owned COMAC makes is one less sale for Airbus or Boeing.

This is why the United States and ideally allied governments need to take steps to limit Chinese market gains in high-fixed-cost industries. China is too powerful, and the World Trade Organization is too outdated and ossified, to provide an effective check on China’s systematic rule-breaking. The Trump administration led an effort to limit China’s gain in telecom equipment by banning Huawei and ZTE and convincing many allies to do the same. America and allied governments should do the same for all Chinese high-fixed-cost industries that have benefited from China’s

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innovation mercantilist policies. In the United States, this could be done by reforming Section 337 of the U.S. International Trade Commission’s statute to empower it to bar imports of the Chinese products in question.

ANSWERING SKEPTICS

Some will object by arguing that all jobs are good jobs, so why shouldn’t U.S. policy protect all industries? But if the U.S. government did that, other nations would respond in turn, leading to balkanized markets. Some industries that now lose in global competition might expand, but industries that now succeed in global competition would contract. The former often pay lower wages and are less strategically important to our techno-economic battle with China.

But isn’t global market expansion key to all industries? U.S. Commerce Secretary Gina Raimondo wrote recently, “When American businesses engage in international markets—where some 95 percent of the world’s consumers live—we profit and prosper as a global society.” But it is important to note this is really only true for high-fixed-cost industries. For the others, the rest of the world is where 95 percent of the world’s producers are, too. If not for the fact that we need global economies of scale and we need to import things we can’t make, the U.S. economy would be no larger if it did not trade than if it did. Global market expansion is not essential for most industries, except to sell more, and there are domestic limits to that based on supply of labor. But global market access is existential for high-fixed-cost industries. Otherwise, their costs cannot fall, they cannot continue investing in research and development, and competitors will gain structural advantages that ultimately can lead to the demise of U.S. high-fixed-cost firms and industries. It’s time U.S. trade policy recognized this more nuanced and sophisticated reality. ◆