

CHAPTER 5

A State-Centered Approach to Trade Politics

In the fall of 2017, the United States announced its intention to impose tariffs of 300 percent on the Canadian company Bombardier's new C-Series commercial aircraft. The American move came on the heels of a decision by Delta Airlines in 2016 to purchase 135 of the new jets. Boeing responded to Delta's decision by filing a complaint with the U.S. Department of Commerce and the U.S. International Trade Commission alleging that Bombardier had effectively dumped the C-Series into the American market, selling them less than two-third the cost of production. Moreover, Boeing alleged that Bombardier could afford to offer such steep discounts because the Canadian government had subsidized the airliner's development. In total, Bombardier received a little more than \$1.6 billion in various forms from the Canadian government—a significant share of the estimated \$6 billion that Bombardier spent to develop the jet. The steep tariff is thus intended to offset this subsidy from the Canadian government. The Canadian government (as well as the British government which hosts some of Bombardier's production) have threatened to retaliate by not purchasing Boeing-made fighter jets.

How do we make sense of this trade conflict? A society-centered approach suggests that we should look at the political influence of the industries concerned. And indeed, there is little doubt that Boeing has substantial influence in American politics. In 2004, the then president, George W. Bush, acknowledged this influence when he promised Boeing workers that he would end EU subsidies to Airbus. Such influence persists today—in the first year of the Trump administration, Boeing management began direct conversations with the president. Yet, the Boeing–Bombardier conflict also raises issues that are not readily incorporated into

the society-centered approach. In particular, this isn't an instance of conflict between an American import-competing industry and a foreign export-oriented industry. Instead, the conflict is between two export-oriented firms battling over global market share. Moreover, the conflict does not revolve around one government's use of tariffs to protect domestic producers from foreign competition, but instead focuses on retaliation for one state's use of government subsidies to support the domestic firm as it competes for global market share. To fully understand the trade conflict in the commercial aircraft industry, therefore, we have to broaden our understanding of the economics, and perhaps also the politics, of international trade.

We gain this broader understanding in this chapter by developing a state-centered approach to trade politics. A state-centered approach argues that national policymakers intervene in the economy in pursuit of objectives that are determined independently from domestic interest groups' narrow self-interested concerns. Moreover, this approach suggests that such intervention may (but need not necessarily) raise aggregate social welfare. We examine the state-centered approach with a specific focus on government intervention designed to promote the development of specific national industries. We look first at the broader economic justification for protectionism aimed at creating internationally competitive industries, then narrow our focus to the use of such measures by the advanced industrialized countries in high-technology industries, and then apply the logic of this approach to the current U.S.–EU conflict in the commercial aircraft industry. We conclude the chapter by looking briefly at some of the weaknesses of this approach.

STATES AND INDUSTRIAL POLICY

A state-centered approach is based on two central assumptions, both of which contrast sharply with the assumptions embodied in the society-centered approach. The first assumption concerns the impact of protectionism on aggregate social welfare. The society-centered approach argues that protectionism reduces social welfare by depriving society of the gains from trade and by employing society's resources in comparatively disadvantaged industries, but the state-centered approach argues that under certain circumstances trade protection can raise social welfare.

The second assumption concerns whether governments can operate independently of interest group pressures. The society-centered approach

argues that national policy reflects the balance of power among competing interest groups, but the state-centered approach argues that under specific circumstances governments are relatively unconstrained by interest-group demands. As a consequence, a government's trade and economic policies embody the goals of national policymakers rather than the demands of domestic interest groups. The state-centered approach combines these two assumptions to suggest that under a specific set of circumstances, governments will intervene in the domestic economy with tariffs, production subsidies, and other policy instruments in ways that raise aggregate social welfare.

To fully understand this approach, we need to understand the conditions under which such intervention may raise social welfare. We then can examine the institutional characteristics that enable national policymakers to act autonomously from interest groups to capture these welfare gains.

The Infant-Industry Case for Protection

The economic justification for the state-centered approach rests on the claim that targeted government intervention can increase aggregate social welfare. This claim stands in stark contrast to the conclusions drawn from the standard model of trade that we examined in [Chapter 3](#) and extended in our discussion of the domestic adjustments to trade in [Chapter 4](#). The standard model rules out such welfare-increasing government intervention by assumption. In the standard model, society does best by removing all forms of trade protection and by specializing in its comparatively advantaged industry. Maintaining protection merely deprives society of the welfare gains from trade.

Moreover, in the standard trade model, nothing makes it difficult for factors currently employed in comparatively disadvantaged industries to move into the comparatively advantaged sector. Factors of production will move into comparatively advantaged industries because it is profitable to do so—the returns in these industries are higher than the returns in the comparatively disadvantaged industries. Such movement will take time, there will be adjustment costs, and there is a case to be made for government policies that help individuals manage these costs, but such policies are oriented toward shifting workers and resources into sectors where they would go anyway. In this model, tariffs and other forms of protection can only make society worse off by preventing factors from moving out of low-return and into high-return industries. In the world depicted by the standard trade models, therefore, government intervention

cannot raise social welfare.

In order to claim that a tariff and other forms of government intervention raise social welfare, one must be able to demonstrate that something prevents factors from shifting into industries that yield higher returns than are available in other sectors of the economy. Historically, this justification has been provided by the infant-industry case for protection. The **infant-industry case for protection** argues that there are cases in which newly created firms (infants, so to speak) will not be efficient *initially* but could be efficient in the long run if they are given time to mature. Consequently, a short period of tariff protection will enable these industries to become efficient and begin to export. Once this point has been reached, the tariff can be removed. The long-run welfare gains created by the now-established industry will be greater than the short-run losses of social welfare imposed by the tariff.

There are two reasons why an industry may not be efficient in the short run, but could be efficient in the long run: economies of scale and economies of experience (Kenen 1994, 279–281). **Economies of scale** arise when the cost of production varies with the size of output, that is, when the unit cost of producing falls as the number of units produced rises. For example, it is quite costly to develop a new commercial aircraft. Estimates put the cost of developing Boeing's new 777 at around \$3 billion. The unit cost of production will be very high if Boeing produces only a few of these planes, as we must divide this fixed cost by a small number of final goods. The unit cost falls substantially, however, if Boeing produces 1,000 of these new planes. What we see, then, is that the average cost of each unit falls as the number of units produced rises. Firms in industries with such scale economies face a dilemma, however. They can produce efficiently and begin to export once they produce enough output to achieve the available scale economies. In an open economy, however, these firms must compete immediately against established foreign producers that have already achieved economies of scale. Consequently, a new firm will have a hard time selling its higher-average-cost output in the face of competition from lower-cost firms. Consequently, the new firm will never reach the level of output necessary to achieve economies of scale.

In such cases, a tariff might be welfare improving. By imposing a tariff, the government could effectively deliver the domestic market to the infant domestic firm. With a guaranteed market, the domestic firm could sell its early high-cost output to domestic consumers and eventually produce enough to achieve economies of scale. Once it had done so, it could then

compete against foreign producers without the need for tariff protection. The tariff would then be removed.

Economies of experience arise when efficient production requires specific skills that can only be acquired through production in the industry. In many industries, efficient production requires “seasoned managers, skilled workers, and reliable suppliers of equipment and materials” (Kenen 1994, 280). Because these skills are lacking by definition in an infant industry, it will be costly to produce the early units of output. Over time, however, management skills improve, workers learn how to do their tasks efficiently, and reliable suppliers are found and supported. Costs of production fall as experience is gained. For example, when Airbus built its first jet, it took 340,000 person-hours to assemble the fuselage. As Airbus gained experience, however, the time required to assemble the jets fell rapidly. By the time that Airbus had produced 75 aircraft, only 85,000 person-hours were required to assemble the fuselage, and eventually this number fell to 43,000 person-hours (McIntyre 1992, 36). The efficiency gains realized as a result of these dynamics are often called “moving down the learning curve.” Again, however, the new firm faces a dilemma. In an unprotected market, it won’t be cost competitive in the face of established foreign producers. Consequently, it will never be able to produce enough output to realize these economies of experience. As with economies of scale, a tariff can allow the infant industry to realize the cost savings available from economies of experience and achieve greater efficiency. Once it has done so, it can begin to export, and the tariff can be removed.

A Closer Look

Criticism of the Infant-Industry Case for Protection

Many economists are skeptical about the claim that government intervention is the best response to the problems highlighted by the infant-industry argument (see Kenen 1994, 281). First of all, a tariff is rarely the best policy response to the central problem the infant industry confronts. Economists argue that a subsidy is a much better approach because it is more efficient. Subsidies are a more efficient policy than a tariff because they target the same policy goal—helping the domestic industry cover the gap between its production costs and established foreign producers’ costs—but they don’t reduce consumer welfare like tariffs do (Kenen 1994, 281). Thus, a subsidy is more efficient.

However, a government subsidy may not improve social welfare

either. The case against a subsidy arises from the fact that a firm that will be profitable in the long run but must operate at a loss in the short run should be able to borrow from private capital markets to cover its short-run losses. Such borrowing obviates the need for a subsidy because it enables the firm to sell its goods at the world price and cover its short-term losses with the borrowed funds. Thus, as long as capital markets are efficient and not “strongly averse to risk,” infant industries should be able to borrow at an interest rate that reflects the social rate of return on capital. If a firm can’t borrow at an interest rate that reflects the social rate of return to capital, then the market is essentially saying that this industry is not the best place to invest society’s scarce resources. Consequently, the firm shouldn’t be supported with subsidies or tariffs (Kenen 1994, 281). In other words, when capital markets are efficient, the firm should borrow rather than rely on the government; if it can’t borrow, the government shouldn’t help it either.

This critique of government intervention fails to hold in two circumstances. First, a firm may be reluctant to borrow from private markets when the problem it faces arises from economies of experience. In such instances, borrowed funds yield long-run efficiency by allowing workers employed at a particular firm to gain the skills required to operate efficiently. Yet, once workers have acquired these skills, they may go to work for other firms. If they do, the firm that has paid for their training will be unable to achieve economies of experience and cannot repay the loan. In this instance, government support for the industry might be helpful, but economists argue that government assistance in such cases should take the form of broad government-funded training programs rather than narrow subsidies to a specific firm.

The criticism of subsidies also fails to hold if the private capital market is inefficient and therefore won’t loan to a firm entering an infant industry. If this is the case, the firm will have little capacity to gain the financial resources it needs to cover its short-term losses. Even here, however, economists argue that a subsidy or a tariff may not be the right response. If the government is determined to support the development of a specific industry, then it should do what the private capital market won’t and extend loans to firms in this industry rather than provide a subsidy. If the government is primarily interested in raising social welfare, however, economists argue that the best thing it can do in this circumstance is strengthen the private capital market

so it does operate efficiently (Baldwin 1969). Thus, even though most economists agree that there will be instances in which firms that are not efficient in the short run can become efficient in the long run, there is considerable skepticism about the extent to which government intervention is the only, or the best, solution to this dilemma.

Therefore, tariffs and other forms of government intervention may sometimes improve social welfare, because a disjuncture between the social and private returns from a particular industry may prevent the shift of factors out of relatively low-return industries and into relatively high-return industries (Balassa and Associates 1971, 93). In other words, certain industries may offer high social returns over the long run (that is, they will provide large benefits to society as a whole), but the short-run private returns (that is, the profits realized by the person or firm making the investment) are likely to be negative. Consequently, factors don't move automatically into the potentially high-return industry. A tariff, or another form of government intervention, may encourage factors to move into this industry by raising the short-run return above what it would be without a tariff.

The logic of the infant-industry case for protection has been adopted by governments in many late-industrializing countries. A late-industrializing country is one that is trying to develop manufacturing industries in competition with established manufacturing industries in other countries. This term obviously describes most developing countries in the contemporary international economic system. But it once described many of today's advanced industrialized countries, including the United States, as they attempted to develop manufacturing industries in the face of dominant British manufacturing power in the nineteenth century. Indeed, the infant-industry argument was first developed by an American, Alexander Hamilton, in 1791 as an explicit policy for the development of manufacturing industry in the United States. Hamilton's argument was further developed by the Germany political economist Fredrick List in the mid-nineteenth century. Like Hamilton, List was primarily interested in thinking about how the German government could encourage the growth of manufacturing industries in the face of established British dominance. The infant-industry argument continued to have an important impact on government trade policies throughout the twentieth century. Many argue that Japan's postwar trade policies reflect the logic of the infant-industry argument as the Japanese government used a variety of policy instruments

to encourage the development of advanced manufacturing industries in the face of American competitive advantages. Many developing-country governments also embraced the logic of the infant-industry argument throughout the early postwar periods, as we will see in greater detail in [Chapter 6](#).

The policies that governments have adopted to promote the development of infant industries are known collectively as industrial policy. **Industrial policy** can be defined as the use of a broad assortment of instruments, including tax policy, subsidies (including the provision of state credit and finance), traditional protectionism, and government procurement practices, in order to channel resources away from some industries and direct them toward those industries that the state wishes to promote. The use of such policies is typically based on long-term economic development objectives defined in terms of boosting economic growth, improving productivity, and enhancing international competitiveness. The specific goals that governments pursue often are determined by explicit comparisons to other countries' economic achievements (Wade 1990, 25–26). In postwar Japan, for example, the explicit goal of Japanese industrial policy was to catch up with the United States in high-technology industries. In much of the developing world, industrial policy was oriented toward creating economic structures that paralleled those of the advanced industrialized countries.

STATE STRENGTH: THE POLITICAL FOUNDATION OF INDUSTRIAL POLICY

The ability of any government to effectively design and implement an industrial policy is dependent on the political institutions within which it operates. The various institutional characteristics that make some states more and others less able to design and implement coherent industrial policies can be summarized by the concept of state strength. **State strength** is the degree to which national policymakers, a category that includes elected and appointed officials, are insulated from domestic interest-group pressures.

Strong states are states in which policymakers are highly insulated from such pressure, whereas weak states are those in which policymakers are fully exposed to such pressures. Strong states are characterized by a high degree of centralization of authority, a high degree of coordination among state agencies, and a limited number of channels through which societal actors can attempt to influence policy. In contrast, weak states are

characterized by decentralized authority, a lack of coordination among agencies, and a large number of channels through which domestic interest groups can influence economic policy.

These characteristics of political institutions make it easier for strong states to formulate long-term plans embodying the national interest. In weak states, policymakers must respond to the particularistic and often short-run demands of interest groups. Strong states also may be more able than a weak state to remove protection once an infant industry has matured. In addition, strong states may be more able to implement industrial policies that redistribute societal resources, because policymakers need worry less that policies that redistribute resources from one domestic group to another will have a negative impact on their position in power.

Japan is often depicted as the preeminent example of a strong state that has been able and willing to use industrial policy to promote economic development (see, for example, Johnson 1982). The Japanese state centralizes power and provides limited channels of access to domestic interest groups. Because of this highly centralized state, Japan has been able to pursue a coherent industrial policy throughout the postwar period. The Ministry of International Trade and Industry (MITI: now called the Ministry of Economy, Trade, and Industry or METI) and the Ministry of Finance (MoF) were the principal agencies involved in developing and implementing industrial policy. In the immediate postwar period, these agencies gave priority to economic reconstruction and to improving the prewar industrial economy. Since the 1960s, greater emphasis has been placed on promoting rapid economic growth and developing internationally competitive high-technology industries (Pempel 1977, 732).

With this goal firmly in mind, the Japanese state pursued an active industrial policy (called administrative guidance) through which it channeled resources to those industries it determined critical to Japanese success. Together, the MITI and MoF targeted specific industries for development, starting with heavy industries (steel, shipbuilding, automobiles) in the early postwar period and then shifting to high-technology industries during the 1970s. The state pressured firms to invest in the industries targeted for development, and those that made such investments benefited from tariff and non-tariff forms of protection, tax credits, low-cost financing, and other government subsidies. Some scholars suggest that Japan's remarkable postwar economic performance was a direct result of this state-centered approach to economic

development (Johnson 1982).

France also relied heavily upon industrial policies throughout much of the postwar period (Hart 1992). The French state is highly centralized, and French bureaucracies are tightly insulated from societal group pressures, as in Japan. This structure allowed the French government to pursue an industrial policy aimed at developing key industries with little direct influence from domestic interest groups. A former director of the Ministry of Industry described the policy-making process:

First, we make out a report or draw up a text, then we pass it around discreetly within the administration. Once everyone concerned within the administration is agreed on the final version, then we pass this version around outside the administration. Of course, by then it is a *fait accompli* and pressure cannot have any effect.

(quoted in Katzenstein 1977, 18)

In the early postwar period, the French state formulated development plans to “establish a competitive economy as an essential base for political independence, economic growth, and social progress” (Katzenstein 1977, 22). French industrial policy in this period was based on a strategy of “National Champions,” under which specific firms in industries deemed by the French state to be critical to French economic development received support. In the 1950s and 1960s, for example, two French steel companies and a small number of French auto producers (Renault, Simca, Peugeot) received state support. During the 1960s and 1970s, the French state attempted to develop a domestic computer industry by channeling resources to specific French computer companies such as Machines Bull. Most regard this strategy as relatively unsuccessful, because French national champions failed to become competitive in international markets (Hart 1992). However, the current French government seems poised to revive this approach, announcing in early 2005 the creation of a new industrial policy oriented toward promoting national champions in high-technology industries.

In contrast to Japan and France, the United States typically is characterized as a weak state (Katzenstein 1977; Ikenberry et al. 1988). Political power in the United States is decentralized through federalism, through the division of powers within the federal government, and through independent bureaucratic agencies. This decentralization of power in turn provides multiple channels through which domestic interest groups can attempt to influence policy. Consequently, “American state officials find it difficult to act purposefully and coherently, to realize their preferences in

the face of significant opposition, and to manipulate or restructure their domestic environment” (Ikenberry et al. 1988, 11). American trade and economic policy therefore more often reflects the interests of societal pressure groups than the “national interest” defined by state policymakers.

This does not mean that the United States has been unable to support critical industries. American national security and defense policies have channeled substantial resources to maintaining technological leadership over potential rivals. To maintain this lead, the U.S. government has financed the basic research that underlies many high-technology products, including computers, telecommunications, lasers, advanced materials, and even the Internet. In addition, Department of Defense contracts have supported firms that produce both military and civilian items. Thus, even though the United States is a weak state, we do see a form of industrial policy in the U.S. government’s support for basic research and in its defense-related procurement practices designed to meet national security objectives.

Policy Analysis and Debate

Green Industrial Policy in the U.S.?

Question

Should the U.S. government employ industrial policy to encourage the development of green technology?

Overview

During the 2008 presidential campaign, Barack Obama pledged to spend \$150 billion over 10 years developing new green technologies, and another \$60 billion improving energy-related infrastructure. In January 2010, President Obama began a new program that provided \$2.3 billion in funding to 183 firms engaged in clean-energy manufacturing, arguing that such programs boost employment while benefiting the environment. At the same time, President Obama has indicated that he will be hesitant to approve of any new trade agreements that do not include environmental protections. On several dimensions, in other words, the Obama administration is attempting to reorient the U.S. economy and trade around environmentally friendly manufacturing and infrastructure. This has generated debate over the government’s role in shaping the national economy.

Why is the use of industrial policy controversial? Advocates of green industrial policies—including former Secretary of Labor Robert Reich, the AFL-CIO, and political commentators like Thomas Friedman—claim that government investment is needed to overcome high start-up costs for new industry, boost productivity in high-growth technologies, and maintain competitiveness in globalized markets. Without government involvement, advocates say, the United States will sacrifice the gains from early development of new technologies to other countries. Opponents of green industrial policies—including many economists, business groups, and free-trade advocates—claim that government intervention misdirects investment to less productive industries, that choosing economic winners and losers in the political arena leads to corruption, and that American industry will have an unfair advantage over their foreign competitors. Both sides can point to examples of industrial policies that provide evidence for their claims.

Policy Options

- Use the power of the U.S. government to promote the development of new green technologies by shifting resources into sectors through taxation and redistribution.
- Allow technological development to occur through the market, and resist government interference.

Policy Analysis

- What interest, if any, do other states have in U.S. industrial policy? Why is this the case?
- How might U.S. trading partners react to greater U.S. government involvement? Is this optimal?
- What role does domestic politics play in determining international outcomes in trade and environmental policies?

Take A Position

- What option do you prefer? Justify your choice.
- What criticisms of your position should you anticipate? How would you defend your recommendations against these

criticisms?

Resources

Online: Online searches for “industrial policy” and “green jobs.”

In Print: For a less rigorous, but best-selling, discussion of this topic, see Thomas L. Friedman, *Hot, Flat, and Crowded: Why We Need a Green Revolution – And How It Can Renew America* (New York: Farrar, Straus, & Giroux, 2008). For a more academic treatment of development and industrial policy, see Dani Rodrik, *One Economics, Many Recipes: Globalization, Institutions, and Economic Growth* (Princeton, NJ: Princeton University Press, 2008).

The state-centered approach, therefore, argues that state policymakers can use industrial policy to improve social welfare. In contrast to the standard model of trade, this approach argues that factors may not move automatically from relatively low-return industries into relatively high-return industries. In such instances, targeted government intervention, in the form of a tariff or a production subsidy, can encourage movement into these industries. Over the long run, the welfare gains generated by this industry are substantially larger than the welfare losses incurred during the period of protection. The ability of policymakers to effectively pursue such policies, however, is strongly influenced by the institutional structure of the state in which they operate. In strong states, such as Japan and France, policymakers are insulated from domestic interest groups and are therefore able to use industrial policy to promote economic development. In weak states, such as the United States, policymakers cannot easily escape interest-group pressures. As a consequence, trade and economic policy is more likely to reflect the particularistic demands of these groups than any broader conceptions of social welfare.

INDUSTRIAL POLICY IN HIGH-TECHNOLOGY INDUSTRIES

High-technology industries have been one area in which governments in many advanced industrialized countries have relied heavily on industrial policies. Boosting the international competitiveness of such industries has been the principal goal of such policies. High-technology industries are highly valued for the contribution they make to national income. These

industries tend to earn **rents**; that is, they earn a higher-than-normal return on an investment, and they pay higher wages to workers than do standard manufacturing industries. In addition, relatively recent developments in economic theory that build on the basic insight of the infant-industry case for protection suggest that governments can use industrial policy to create internationally competitive domestic high-technology industries. We examine these issues here, focusing first on the economic theories that justify the use of industrial policy in high-technology industries and then examining two cases in which industrial policy appears to have enabled high-technology firms based in Japan and the EU to become internationally competitive at the apparent expense of high-technology firms based in the United States. We conclude by returning to the current U.S.–EU dispute in commercial aircraft.

Strategic-Trade Theory

Strategic-trade theory provides the theoretical justification for industrial policy in high-technology industries. **Strategic-trade theory** expands on the basic insight of the infant-industry case for protection. Like the infant-industry case, strategic-trade theory asserts that government intervention can help domestic firms achieve economies of scale and experience in order to become efficient and competitive in global markets. In contrast to the classical infant-industry argument, which assumes that markets are perfectly competitive, strategic-trade theory asserts that many high-tech industries are characterized by oligopolistic competition; that is, they feature competition between only a few firms. The combination of economies of scale and experience on the one hand and oligopolistic competition on the other creates a theoretical rationale for government intervention to raise national income.

An **oligopoly** is an industry dominated by a small number of firms. The world auto industry, for example, is dominated by only about eight firms. The world market for long-distance commercial aircraft is dominated by only two firms. Such industries are clearly different from, say, agriculture, in which thousands of farms produce for the world market. Economic dynamics in oligopolistic market structures are quite different from the dynamics we see in perfectly competitive markets. The economic analysis of oligopolistic competition can be quite complex, however, and a detailed analysis of such competition would take us far from our primary concern. Consequently, we will leave a detailed analysis of such competition to the side and simply state that firms operating in oligopolistic markets earn

excess returns—profits greater than could be earned in equally risky investments in other sectors of the economy (Krugman and Obstfeld 1994, 282).

Suppose an American firm dominates the world market for commercial aircraft. The United States captures the excess returns available in this industry. As a result, American workers employed in this industry, as well as the people who have invested their savings in this industry, earn higher incomes than they would earn in the next-best use of their labor or savings. American national income is higher than it would be otherwise. If a European firm dominates the world market for commercial aircraft, Europe captures the excess returns and enjoys the higher “national” income. And because an oligopolistic industry is one in which only a limited number of firms can operate, only a small number of countries can capture the available excess returns. It is certainly reasonable to suppose, therefore, that societies would compete over these industries. Strategic-trade theory thus suggests that in some industries global economic interaction gives rise to zero-sum competition over the excess returns available in oligopolistic high-tech industries.

Who is likely to win this competition? In the absence of intervention by any government, the firm that is the first to enter a particular industry will win, and in doing so effectively deter subsequent entry by potential rivals. Thus, such industries offer a first-mover advantage. This first-mover advantage arises from economies of scale and experience. Suppose an American high-tech firm is the first to produce and market a product such as commercial jet aircraft. Because achieving economies of scale and experience is central to the ability to produce commercial jets efficiently, the United States, by virtue of being first into the market, has a production cost advantage over rivals who may want to enter the market at a later time. As a consequence, a European firm that could be competitive once it achieved economies of scale and experience is deterred from entering the industry because the cost advantage enjoyed by the established American firm makes it very difficult to sell enough aircraft to achieve these economies. After all, who will buy the new entrant’s higher-cost output? Absent such sales the new firm will never realize the economies of scale and experience essential to long-term success. The U.S. firm, therefore, has an advantage in the industry only because it is the first into the market. Consequently, the United States will enjoy the higher national income yielded by the excess returns in the commercial aircraft industry. Other countries are denied these excess returns, even though were they able to achieve the necessary economies of scale and experience, they would be

every bit as successful as the American first mover.

Government intervention may have a powerful effect on the willingness of a latecomer to enter the industry. That is, targeted government intervention may enable late entrants to successfully challenge first movers. By doing so, government intervention shifts the excess returns available in a particular industry from a foreign country to the national economy. The logic of this argument can be illustrated using some fairly simple game theory (Krugman 1987). Let's assume that there are two firms, one American and one European, interacting in a high-tech industry, say commercial aircraft, which will support only one producer. Each firm has two strategies: to produce commercial aircraft or to not produce. The payoffs that each firm gains from the four possible outcomes are depicted in [Figure 5.1a](#). There are two possible equilibrium outcomes in this game, one in which the American firm produces and the European firm does not (cell II), and one in which the European firm produces and the American firm does not (cell IV). Thus, this particular high-tech industry will be based in the United States or in Europe, but never in both. Whichever country hosts the firm earns 100 units in income.

Which country captures the industry depends upon which firm is first to enter the market. Let's suppose that the American firm is first to enter the industry and has realized economies of scale and experience. In this case, the European firm has no incentive to enter the industry, because, by doing so, it would earn a profit of 25. If we assume that the European firm is first to enter the market, then it realizes economies of scale and experience. In this case, the American firm has no incentive to enter the market. Thus, even though both firms could produce the product equally well, the firm that enters first dominates the industry. According to strategic-trade theory, therefore, the firm that is first to enter a particular high-technology industry will hold a competitive advantage, and the country that is home to this firm will capture the rents available in this industry.

		European Firm	
		Produce	Not Produce
American Firm	Produce	-5, -5 (I)	100, 0 (II)
	Not Produce	0, 100 (IV)	0, 0 (III)

(a) Payoff Matrix with no Subsidy

		European Firm	
		Produce	Not Produce
American Firm	Produce	-5, 5 (I)	100, 0 (II)
	Not Produce	0, 110 (IV)	0, 0 (III)

(b) Payoff Matrix with European Subsidy

FIGURE 5.1

The Impact of Industrial Policy in High-Technology Industries

Against this backdrop, we can examine how governments can use industrial policy to help domestic high-technology firms. Government intervention can help new firms enter an established high-technology industry to challenge, and eventually compete with, established firms. Government assistance to these new firms can come in many forms. Governments may provide financial assistance to help their new firms pay for the costs of research and development. Such subsidies help reduce the costs that private firms must bear in the early stages of product development, thereby reducing the up-front investment a firm must make to enter the industry. European governments participating in the Airbus consortium, for example, have subsidized the development of Airbus aircraft. Governments also may guarantee a market for the early and more expensive versions of the firm's products. Tariffs and quotas can be used to keep foreign goods out, and government purchasing decisions can favor domestic producers over imports. The Japanese government, for example, purchased most of its supercomputers from Japanese suppliers in the 1980s, even though the supercomputers produced by the American firm Cray Industries were cheaper and performed at a higher level. The guaranteed market allows domestic firms to sell their high-cost output from early stages of production at high prices. The combination of financial support and guaranteed markets allows domestic firms to enter the market and move down the learning curve. Once the new firms have realized economies of scale, they can compete against established firms in international markets.

We can see the impact of such policies on firms' production decisions by returning to our simple game (see [Figure 5.1b](#)). Suppose that the American firm is the first to enter and dominates the industry. Suppose now that European governments provide a subsidy of 10 units to the European firm. The subsidy changes the payoffs the European firm receives if it produces. In contrast to the no-subsidy case, the European firm now makes a profit of 5 units when it produces, even if the American firm stays in the market. The subsidy therefore makes it rational for the European firm to start producing. Government support for domestic high-technology firms has a second consequence that stems from the oligopolistic nature of high-tech industries. Because such industries support only a small number of firms at profitable levels of output, the entry of new firms into the sector must eventually cause other firms to exit. Thus, government policies that promote the creation of a successful industry in one country undermine the established industry in other countries.

This outcome is also clear in our simple game. Once the European firm begins producing, the American firm earns a profit of 25 if it continues to produce and a profit of 0 if it exits the industry. Exit, therefore, is the American firm's rational response to the entry of the European firm. Thus, the small 10-unit subsidy provided by European governments enables the European firm to eliminate the first-mover advantage enjoyed by the American firm, but ultimately drive the American firm out of the industry. As a consequence, Europe's national income rises by 100 units (the 110-unit profit realized by the European firm minus the 10-unit subsidy from European governments), whereas America's national income falls by 100 units. A small government subsidy has allowed Europe to increase its national income at the expense of the United States.

Strategic-trade theory suggests, therefore, that the location of high-technology industries has little to do with cross-national differences in factor endowments and a lot to do with market structure and the assumptions we make about how production costs vary with the quantity of output. This is a world in which the classical model of comparative advantage doesn't hold. International competitiveness and the pattern of international specialization in high-technology industries are attributed as much to the timing of market entry as to underlying factor endowments.

STRATEGIC RIVALRY IN SEMICONDUCTORS AND COMMERCIAL AIRCRAFT

The semiconductor industry and the commercial aircraft industry illustrate these kinds of strategic trade rivalries between the United States, Japan, and the EU in the contemporary global economy. In the semiconductor industry, American producers enjoyed first-mover advantages and dominated the world market until the early 1980s. The semiconductor industry prospered in the United States in part due to government support in the form of funding for research and development (R&D) and for defense-related purchases. The U.S. government financed a large portion of the basic research in electronics—as much as 85 percent of all R&D prior to 1958, and as much as 50 percent during the 1960s. At the same time, the U.S. defense industry provided a critical market for semiconductors. Defense-related purchases by the U.S. government absorbed as much as 100 percent of total production in the early years. Even in the late 1960s, the government continued to purchase as much as 40 percent of production. These policies allowed American semiconductor firms to move down the learning curve and realize economies of scale. This first-mover advantage was transformed into a dominant position in the global market. In the early 1970s, U.S. semiconductor producers controlled 98 percent of the American market and 78 percent of the European market.

Beginning in the 1970s, the Japanese government targeted semiconductors as a sector for priority development and used two policy measures to foster a Japanese semiconductor industry. First and most importantly, the Japanese government used a variety of measures to protect Japanese semiconductor producers from American competition. Tariffs and quotas kept American chips out of the Japanese market. The Japanese government also approved very few applications for investment by foreign semiconductor firms and restricted the ability of American semiconductor firms to purchase existing Japanese firms. As a direct result, American semiconductor firms were unable to jump over trade barriers by building semiconductor production plants in Japan. The Japanese industrial structure—a structure in which producers develop long-term relationships with input suppliers—helped ensure that Japanese firms that used semiconductors as inputs purchased from Japanese rather than American suppliers. Finally, government purchases of computer equipment discriminated against products that used American chips in favor of computers that used Japanese semiconductors. Second, the Japanese government provided financial assistance to more than 60 projects connected to the semiconductor and computer industry. Such financial assistance helped cover many of the R&D costs Japanese

producers faced.

The extent of Japanese protectionism can be appreciated by comparing U.S. market shares in the EU, and Japanese markets. Whereas American semiconductor firms controlled 98 percent of the American market and 78 percent of the EU market in the mid-1970s, they held only 20 percent of the Japanese market (Tyson 1995, 93). By 1976, Japanese firms were producing highly sophisticated chips and had displaced American products from all but the most sophisticated applications in the Japanese market. Success in the Japanese market was followed by success in the global market. Japan exported more semiconductors than it imported for the first time in 1979. By 1986 Japanese firms had captured about 46 percent of global semiconductor revenues, whereas the American firms' share had fallen to 40 percent (Tyson 1995, 104–105). By protecting domestic producers and subsidizing R&D costs, the Japanese government helped Japanese firms successfully challenge American dominance of the semiconductor industry.

A similar dynamic is evident in U.S.–European competition in the commercial aircraft sector. Two American firms, Boeing and Douglas (later McDonnell Douglas), dominated the global market for commercial aircraft throughout the postwar period, in part because of U.S. government support to the industry provided through the procurement of military aircraft (Newhouse 1982; U.S. Congress, Office of Technology Assessment 1991, 345). Work on military contracts enabled the two major American producers to achieve economies of scale in their commercial aircraft operations. Boeing, for example, developed one of its most successful commercial airliners, the 707, as a modified version of a military tanker craft, the KC-135. This allowed Boeing to reduce the cost of developing the commercial airliner. Both jets in turn benefited from the experience Boeing had gained in developing the B-47 and the B-52 bombers (OTA 1991, 345). As Joseph Sutter, a Boeing executive vice president, noted, “We are good ... partly because we build so many airplanes. We learn from our mistakes, and each of our airplanes embodies everything we have learned from our other airplanes” (quoted in Newhouse 1982, 7). The accumulated knowledge from military and commercial production gave the two American producers a first-mover advantage in the global market for commercial airliners sufficient to deter new entrants.

In 1967, the French, German, and British governments launched Airbus Industrie to challenge the global dominance of Boeing and McDonnell Douglas. Between 1970 and 1991, these three European governments

provided between \$10 billion and \$18 billion of financial support to Airbus Industrie, an amount equal to about 75 percent of the cost of developing Airbus airliners (OTA 1991, 354). As a consequence, by the early 1990s Airbus Industrie had developed a family of commercial aircraft capable of serving the long-range, medium-range, large passenger, and smaller passenger routes. Airbus's entry into the commercial aircraft industry had a dramatic impact on global market share. As [Table 5.1](#) makes clear, in the mid-1970s Boeing and McDonnell Douglas dominated the market for large commercial airliners. Airbus began to capture market share in the 1980s, however, and by 1990 it had gained control of 30 percent of the market for large commercial airliners. In 1994 Airbus sold more airliners than Boeing for the first time. And the ensuing 10 years indicates that 1994 was no fluke, as Airbus has firmly established itself as a dominant force in the global market for long-range commercial jets.

As a consequence of Airbus's success, a substantial portion of the rents available from the production and sale of commercial airliners has been transferred from the United States to Europe. Thus, by subsidizing the initial costs of aircraft development, European governments have been able to capture a significant share of the global market for commercial aircraft and the income generated in this sector, at the expense of the United States.

Strategic-trade rivalries of this kind have been a source of conflict in the international trade system. Countries losing high-technology industries as a consequence of the industrial policies pursued by other countries can respond by supporting their own firms to offset the advantages enjoyed by foreign firms or by attempting to prevent foreign governments from using industrial policy. In the United States, which considered itself a victim of the industrial policies adopted by Japan and the EU, the national debate has focused on both responses. Considerable pressure emerged during the 1980s and early 1990s for a national technology policy. Proposals were advanced for the creation of a government agency charged with reviewing global technology and

evaluating the likely course of key American industries; comparing these baseline projections with visions of industry paths that would be compatible with a prosperous and competitive economy; and monitoring the activities of foreign governments and firms in these industries to provide an early warning of potential competitive problems in the future.

(Tyson 1995, 289)

TABLE 5.1

Market Share in Global Commercial Aircraft

	Boeing	McDonnell Douglas*	Airbus
1975	67%	33%	0
1985	63%	20%	17%
1990	54%	16%	30%
2005–2007	50.8%	n.a.†	49.2%

* Merged with Boeing in 1997; its commercial aircraft fleet is no longer produced.

† n.a., not available.

Source: Data for 1975–1990 are calculated from Tyson 1995, 158–159. Data for 2005–2007 are from Boeing and Airbus.

Many recommended that the U.S. government reduce its R&D support for military and dual-use projects (*dual use* refers to projects with military and commercial applications) and increase the amount of support provided to strictly commercial applications. Proponents of a national technology strategy also encouraged greater cooperation between the public and private sector on precompetitive research in a wide range of advanced technologies. Such proposals played an important role in the first Clinton administration's thinking about international trade, a role reflected in Clinton's selection of Laura D'Andrea Tyson, an economist and one of the most prominent proponents of such policies, to be the chair of his Council of Economic Advisors.

The United States also put considerable pressure on other governments to stop their support of high-technology industries. A series of negotiations with Japan that was conducted during the 1980s and early 1990s were designed to pry open the Japanese market to internationally competitive American high-technology industries. Such negotiations took place in semiconductors, computers, telecommunications, and other sectors. The rationale for these negotiations is evident from the previous discussion about first-mover advantages. If Japanese firms could be denied a protected market for their early production runs, they would never realize the scale economies required to compete in international markets. Opening the Japanese market to American high-technology producers would prevent the emergence of competitive Japanese high-technology firms and thereby help maintain American high-technology leadership. During the 1980s and early 1990s, therefore, the United States responded strategically to the use of industrial policies by Japan and, to a lesser extent, the EU and

adopted policies designed to counter them.

It is within this context that we can understand the current U.S.–EU conflict in the commercial aircraft industry. Boeing has long been concerned about the gains Airbus has made in the global market and has long pressured the U.S. government to try to limit the subsidies that European governments offer. In 1992 the United States and the European Union reached agreement that both would not provide subsidies greater than one-third of the total cost of developing a new airliner or greater than 3 percent of the firm’s annual revenue. In early summer of 2004 the Bush administration, facing considerable pressure from Boeing, informed the EU that it was time to renegotiate this agreement. The time for such a move looked right, at least to Boeing, for both companies were beginning to develop new aircraft, and Boeing argued that each should do so without government support. As Boeing CEO Henry Stonecipher said, the 1992 agreement “no longer reflected market realities” and had “outlived its usefulness” (King 2004). Given Airbus’s current market position, it should stop expecting European governments to give it “truckloads” of money to cover a portion of new aircraft development. “We’re saying enough is enough. You’re very successful, you’re delivering and selling more airplanes than Boeing Why don’t you go to the bank and borrow money?” It was, Boeing argued, “time for Airbus to accept the financial and marketplace risks that true commercial companies experience” (Casert 2004, p. E.03).

Efforts to renegotiate the 1992 agreement proved unsuccessful. Although EU officials seemed willing to accept the American claim that Airbus had received government support (though they denied that such support amounted to more than a token), they asserted that Boeing had itself been the beneficiary of \$23 billion of government subsidies since 1992. These subsidies had come, the EU argued, from U.S. government R&D contracts and from \$3.2 billion in tax reductions, tax exemptions, and infrastructure improvements provided by the state of Washington. Consequently, the EU was willing to discuss a reduction of European assistance to Airbus only in conjunction with an American willingness to accept a reduction of such assistance for Boeing. When the United States proved unwilling to either accept the EU claim or to provide information that would dispute the claim, the negotiations broke down. Days later, the United States announced that it was withdrawing from the 1992 agreement and filed a dispute with the WTO alleging that the EU was in violation of its WTO obligations concerning the use of subsidies that cause harm to foreign competitors. The EU responded immediately by initiating its own

WTO dispute in which it alleged the same thing of the United States. The stakes are high, as estimates suggest that over the next 20 years sales of large commercial aircraft will generate \$2 trillion (Blustein 2004a). It remains to be seen whether American or European producers will capture this income.

CONCLUSION

Even though a state-centered approach directs our attention to the important role that states play in shaping the structure of their domestic economies, it does have some important weaknesses. Three such weaknesses are perhaps most important. First, the state-centered approach lacks explicit microfoundations. The approach asserts that states act in ways that enhance national welfare. A critical student must respond to this assertion by asking one simple question: What incentive does the state have to act in ways that do in fact enhance national welfare? Anyone who has visited the Palace of Versailles in France or has spent any time reading about the experience of other autonomous rulers knows that autonomous states have as much (if not more) incentive to act in the private interests of state officials as they have to act in the interest of society as a whole. Why then would autonomous state actors enrich society when they might just as easily enrich themselves? Answering this question requires us to think about how state actors are rewarded for promoting policies that enhance national welfare and are punished for failing to do so. In answering this question, we develop microfoundations—an explanation that sets out the incentive structure that encourages state officials to adopt policies that promote national welfare. But the state-centered approach currently does not offer a good answer to this question. The reward structure that state policymakers face cannot be elections, for that pushes us back toward a society-centered approach. The reward structure might be security related: one could reasonably argue that states intervene to enhance the power and position of the nation in the international system. We must still explain, however, how these broad concerns about national security create incentives for individual policymakers to make specific decisions about resource allocation. The point is not that such microfoundations could not be developed, but rather, as far as I am aware, that no one has yet done so. As a result, the state-centered approach provides little justification for its central assertion that states will regularly act in ways that enhance national welfare.

Second, the assumption that states make policy independent of domestic

interest-group pressure is misleading. Even highly autonomous states do not stand above *all* societal interests. Interest groups need not dictate policy, as the society-centered approach claims, but they do establish the parameters in which policy must be made. Even in Japan, which probably comes closest to the ideal autonomous state, the Liberal Democrat Party's (LDP) position in government was based in part on the support of big business. Is it merely a coincidence that Japanese industrial policy channeled resources to big business, or did the Japanese state adopt such policies because they were in the interest of one of the LDP's principal supporters? Thus, whereas the society-centered approach assumes too little room for autonomous state action, the state-centered approach assumes too much state autonomy. We may learn more by fitting the two approaches together. This would lead us to expect governments to intervene in the economy to promote specific economic outcomes, but often such policies are consistent with and shaped by the interests of the coalition of societal groups upon which the government's power rests.

Finally, strategic-trade theory itself, which provides the intellectual justification for government intervention in high-technology industries, has considerable weaknesses. Strategic-trade theory is as much a prescriptive theory—one used to derive policy proposals—as it is an explanatory theory. As such, it has some important limitations. The claim that government intervention can improve national welfare is not particularly robust. The conclusions one derives from any theory are sensitive to the assumptions one makes when building the theory. If the conclusions change greatly when one alters some of the underlying assumptions, then the confidence one has in the accuracy of the theory must be greatly diminished. Strategic-trade theory has been criticized for producing strong conclusions only under a relatively restrictive set of assumptions. Although the specific criticisms are too detailed to consider here, the bottom line is that altering the assumptions about how one country's established firms respond to a foreign government's subsidy of its firms, about how many firms are in the sector in question, and about where firms sell their products can either weaken the central claim considerably or introduce so much complexity into the model that the policy implications become opaque.

Thus, strategic-trade theory does not provide unambiguous support for the claim that government intervention in high-technology industries can raise national income. In addition, even if we assume that strategic-trade theory is correct, it is not easy for governments to identify sectors in which intervention will raise national income. It is difficult to identify sectors that

offer such gains and then to calculate the correct subsidy that will shift this activity to domestic producers at a net gain to social welfare. If governments choose the wrong sectors or provide too little or too much support, intervention can reduce rather than raise national welfare. Thus, the precise policy implications of strategic-trade theory are unclear, in part because the theory itself is weak and in part because it is not easy to translate the theory's simpler conclusions into effective policies.

In spite of these weaknesses, the state-centered approach provides a useful check on the tendency of the society-centered approach to focus exclusively on the interests of societal interest groups. The state-centered approach points our attention to the interests of government officials and underscores the need to think about the ability of these officials to act independent from, and even against, the interests of domestic interest groups. By doing so, it suggests that trade policy may not always reflect the balance of power between interest groups, and tells us that we might need to take into account how state interests intervene in this competition in ways that produce outcomes that no interest groups desire. Yet, in spite of these useful insights, I believe that the absence of clearly specified microfoundations in this approach represents a fatal flaw. Without such foundations, the approach can tell us that autonomous state officials will act, but it cannot tell us *how* they will act. Adding such microfoundations, perhaps by combining the dynamics highlighted by the society-centered approach with the rich institutional environment emphasized by the state-centered approach, would enable us to begin thinking about the conditions under which state officials have the capacity for autonomous action, and about the ends to which such autonomous officials will direct their energies.

KEY TERMS

Economies of Experience
Economies of Scale
Industrial Policy
Infant-Industry Case for Protection
Oligopoly
Rents
State Strength
Strategic-Trade Theory

SUGGESTIONS FOR FURTHER READING

For a recent and compelling argument for the continuing importance of industrial policy, see Michael Peneder, 2017. “Competitiveness and Industrial Policy: From Rationalities of Failure towards the Ability to Evolve.” *Cambridge Journal of Economics* 41: 829–858.

You can find excellent treatments of postwar industrial policy in the advanced industrial economies in Richard D. Bingham, *Industrial Policy American-Style: From Hamilton to HDTV* (New York: Routledge, 2015); Christian Grabas, Alexander Nützenadel, editors, *Industrial Policy in Europe after 1945: Wealth, Power and Economic Development in the Cold War* (London: Palgrave MacMillan, 2014); and Mark Metzler, *Capital as Will and Imagination: Schumpeter’s Guide to the Postwar Japanese Miracle* (Ithaca: Cornell University Press, 2013).

Finally, for an argument for using industrial policy to promote sustainable growth, see Dani Rodrik, 2014. “Green Industrial Policy.” *Oxford Review of Economic Policy* 30(3): 469–491.