

An Industrial Policy for Good Jobs

Dani Rodrik



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An Industrial Policy for Good Jobs

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This policy proposal is a proposal from the author. As emphasized in The Hamilton Project's original strategy paper, the Project was designed in part to provide a forum for leading thinkers across the nation to put forward innovative and potentially important economic policy ideas that share the Project's broad goals of promoting economic growth, broad-based participation in growth, and economic security. Authors are invited to express their own ideas in policy proposal, whether or not the Project's staff or advisory council agrees with the specific proposals. This policy proposal is offered in that spirit.

BROOKINGS

Abstract

Industrial policies have been with us for a long time, but often they have been carried out surreptitiously and without clear motivation. The recent revival of discussions around industrial policy provides a welcome opportunity for self-consciously crafting an improved set of policies. A modern approach to industrial policy must respond to new circumstances. It must target “good-jobs externalities,” in addition to the traditional learning, technological, and national security considerations. Relatedly, industrial policy’s traditional focus on manufacturing and globally competitive industries has to be broadened to service sectors and smaller and medium-sized firms. And the practice of industrial policy will need to rely less on traditional top-down policy instruments—such as subsidies and tax incentives for firms—and more on collaborative, iterative interaction whereby public agencies supply a portfolio of customized public services in exchange for firms undertaking soft commitments on the quantity and quality of employment. With these objectives in mind, this paper develops two types of specific initiatives: one at the local level and the other at the federal level. The local approach builds on existing development and business assistance programs that take the form of collaborative partnerships between local development agencies, firms, and other stakeholders aiming to revitalize local communities and create good jobs. The federal initiative is an Advanced Research Projects Agency (ARPA) focused on the promotion of employment-friendly technologies: ARPA-W(orkers).

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Introduction

Industrial policy is as old as the state itself. Virtually every government in history has engaged in policies to promote economic activities regarded as critical to national security, economic well-being, or the sovereign's coffers. Under the influence of free-market ideas, the United States has often viewed itself as outside this tradition. Yet it was none other than one of the nation's founding fathers, Alexander Hamilton, who articulated the earliest and one of the clearest arguments for industrial policy. In his "Report on the Subject of Manufactures," Hamilton (1791) presented a powerful case for subsidizing and protecting America's nascent manufacturing establishments.

Hamilton forcefully took on his critics' counterarguments, which still sound familiar today: supporting manufactures would be a misdirection of resources, would raise domestic prices for industrial goods, would provide an unfair advantage to a specific segment of the economy, would result in domestic monopolies, and would be abused by the recipients of government support. Hamilton did not dispute that other economic activities, and agriculture in particular, may have been more remunerative in late 18th-century America. But he maintained that expanding the manufacturing sector would enlarge the size of the overall economic pie: it would "have the effect of rendering the total mass of useful and productive labor in a community, *greater than it would otherwise be*" (original emphasis). Manufacturing had the benefit, he wrote, of increasing returns to scale, employment creation, and more-rapid technological change.

The United States has never been without industrial policy of some sort. Defense-related industries have always been big beneficiaries of government support through procurement and other means. And even in the heyday of market fundamentalism during the 1980s, President Ronald Reagan actively used protectionist trade policies to prop up segments of US manufacturing. Meanwhile economists have developed a more full-fledged theoretical rationale for industrial policy—based on technological and learning externalities, and coordination failures—that support many of Hamilton's arguments. Nevertheless, the debate on industrial policy has traditionally revolved around the question of *whether* governments should engage in industrial policy at all, instead of the more relevant (and useful) question of *how* they should do so.

Industrial policy is back in fashion these days, as a result of several developments. First, there has been a general dissatisfaction with neoliberalism and its maintained assumption that a hands-off government would produce broad

prosperity for all (Rodrik 2017; Sitaraman 2019). The rise of inequality, economic insecurity, and labor market polarization, as well as the disappearance of good jobs, have contributed to a sense that governments need to be more proactive in the productive sphere. Second, there is greater recognition, even among economists, that dealing with climate change requires interventions in production and investment decisions beyond simply raising the market price of carbon: subsidizing green technologies is an indispensable component of a decarbonization strategy. Finally, there is growing concern in national-security and business circles about China's rise as a technological and business competitor, and a near-consensus that the United States (and the West more broadly) needs to respond by reinvigorating innovation and industrial capabilities. The last factor is reminiscent of the manner in which the US government went into technological overdrive in response to the Soviets' Sputnik challenge of the late 1950s.

It is a good thing that today's conversation is about the *how* rather than the *why* of industrial policy. Since governments always engage in industrial policy, it is desirable that they act deliberately and self-consciously, rather than surreptitiously and without an overall strategic frame. The present economic and technological context for industrial policy is very different—not just from Alexander Hamilton's day, but also from the heyday of industrial policy during the 1960s and 1970s. Moreover, we have learned much about what kind of industrial policies work better. The nature and contours of best-practice industrial policies have changed considerably, thanks to accumulated experience and knowledge. Present-day industrial policy in the United States must be shaped by this new understanding, and should not simply aim to replicate old models that, regardless of how one views their success or failure in the past, are unlikely to work well at present. In brief, policymakers must take into account the transformation of the *why*, *what*, and *how* of industrial policy.

I will make several arguments in this policy proposal.

- First, industrial policy must target what we might call good-jobs externalities, in addition to the aforementioned learning, technological, or national security considerations. Increasing the supply of good jobs is an independent and important objective in and of itself, and one that will not be met as a by-product of pursuing the conventional objectives of spurring innovation in technologically advanced industries or fostering national security.

- Second, and relatedly, industrial policy’s traditional focus on manufacturing and globally competitive industries will need to be broadened to service sectors and smaller and medium-sized firms. Manufacturing is unlikely to generate much employment even if its value-added share in the national economy starts to climb; the bulk of good jobs will have to come from outside manufacturing.
- Third, the practice of industrial policy will need to rely less on traditional top-down policy instruments—such as subsidies and tax incentives for firms—and more on collaborative, iterative interaction whereby public agencies supply a portfolio of customized public services in exchange for firms undertaking soft commitments on the quantity and quality of employment. The state cannot systematically pick winners, as the critics of industrial policy rightly point out. But appropriately structured governance arrangements can act as an information revelation mechanism facilitating learning about what works and what fails, allowing government agencies to abandon failing initiatives and focus on supporting those with the most potential.

I will draw out the policy implications of this approach by considering two types of specific initiatives: one at the local level and the other at the federal level.

The local approach would build on existing development and business assistance programs that are already loosely structured along the lines advocated here. These are collaborative partnerships between local development agencies, firms, and other partners aiming to revitalize local communities and create good jobs. They are organized around an implicit (and evolving) *quid pro quo*: the provision of public services (such as business extension services, infrastructure, or customized training) in return for soft commitments by firms on investment and employment

creation. Such partnerships align with a new, more-flexible, and contextual model of industrial policy that is better suited to the challenge of creating good jobs.

The federal initiative would be the establishment of an Advanced Research Projects Agency (ARPA) focused on the promotion of employment-friendly technologies: ARPA-W(orkers). Starting from the premise that innovations that *complement* rather than *displace* workers are feasible yet currently undersupplied, ARPA-W would promote early-stage investments in digital and other technologies that enhance prevailing worker skills and create good jobs.

Two final introductory remarks about the scope and limitations of this proposal. First, the policies I describe here are not sufficient in themselves to create an inclusive, good-jobs economy; they are restricted to interventions that one would consider as belonging under the rubric of industrial policies. They must be supported and complemented by a variety of regulatory, social insurance, and macroeconomic arrangements that increase the bargaining and organizational power of labor in the workplace, provide a robust safety net for workers and their families, and ensure adequate levels of aggregate demand to run a tight labor market.¹ They are not a substitute for the other remedies and protections that an inclusive economy needs.

Second, I do not claim that good jobs must be the only focus of industrial policies. A robust set of industrial policies would also target the climate transition (to promote green technologies), the high-tech and digital economy (to promote general innovation), and the rebuilding of domestic supply chains (to create a more resilient economy). The governance principles I will describe are quite possibly relevant to all these areas. But just as traditional industrial policies cannot be relied on to serve the needs of a good-jobs economy, the specific policies I advocate here do not necessarily fulfill those other objectives.

The Challenge

The Why: Good-Job Externalities

What constitutes a good job is a subjective and highly contextual matter. Generally speaking, good jobs are those that provide a middle-class living standard, adequate benefits, reasonable levels of personal autonomy, economic security, and career ladders.² Regardless of the specifics of the definition, however, the *sine qua non* of a good job is a high enough level of labor productivity. While bargaining power can affect the division of enterprise surplus, it is ultimately productivity that enables the provision of adequate wages and benefits. As I will explain below, this link between productivity and wages establishes a parallel with the traditional case for industrial policy, but with a focus on the quantity and quality of jobs rather than on the profitability or competitiveness of firms per se.

In practice, the idea of good jobs needs to be operationalized through an evolving set of standards that reflect local conditions and preferences. Metrics to assess the availability of good jobs can be developed, based on surveys of workers' perceptions or objective statistical criteria. There are, in fact, many such measures. Since 2017, the Boston-based workforce development agency Jewish Vocational Service (JVS) has maintained a job quality index, a composite that measures wages, benefits, scheduling flexibility and predictability, access to career ladders, and the degree to which the work environment is supportive (JVS n.d.). A 2020 Gallup survey measured job quality based on a weighted average of respondents' satisfaction on 10 dimensions of work, including "having a sense of purpose and dignity at work" and "having the power to change things that are unsatisfying at work" (Gallup 2020). The survey found fewer than half of workers are in good jobs, defined as scoring three or more on the five-point combined index. The survey also found that non-pay-related aspects of work are typically more important than level of pay when workers judge job quality, even for those in the bottom quintile of incomes.

Similarly, the Good Jobs Institute provides a scorecard for employers, focused on employee basic needs and stability, to allow firms to understand and track their performance on this dimension (Good Jobs Institute n.d.). The Organisation for Economic Co-operation and Development (OECD) maintains a database on job quality, with objective statistical

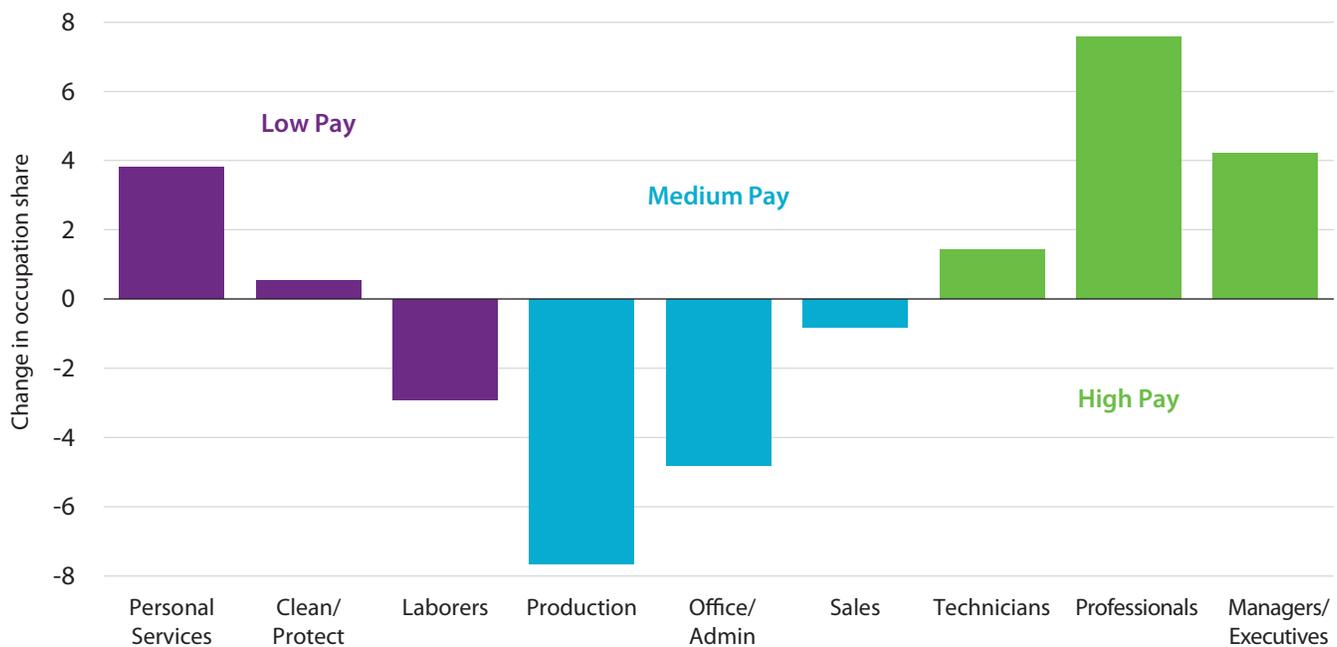
indicator on earnings, labor market security, and the quality of the working environment as subdimensions (OECD n.d.). The OECD database allows disaggregation by gender, age groups, and education as well as comparison across countries—showing that the United States does worse than many others, such as Australia, Austria, Denmark, Finland, Germany, and Switzerland. And in April 2022, the Families and Workers Fund launched a collaborative effort with the US Department of Labor to measure the quality of American jobs, called the Job Quality Measurement Initiative (Families and Workers Fund 2022).

For workers without college degrees, manufacturing and related services have been the traditional source of good jobs—the basis for income mobility and a pathway to the middle class. But globalization, deindustrialization, automation, and generally skill-biased technological change have reduced demand for workers who lack higher levels of education, shrinking the supply of such employment opportunities. Since the 1980s there has been an evident failure of the economy to produce adequate numbers of good jobs to sustain a prosperous and growing middle class. Medium-pay jobs have seen an absolute decline while low- and high-pay jobs have expanded, a phenomenon known as labor market polarization (see figure 1). The waning of factory and office/clerical/sales jobs, along with the weakening of workers' bargaining power, has in turn produced a stagnation in the average real wages of production and nonsupervisory workers and greater economic insecurity (Autor and Dorn 2013; Autor, Mindell, and Reynolds 2020; Eurofound 2017; OECD 2019). Another indication of the scarcity of good jobs is that the American middle class, measured by the share of adults with pretax earnings between the 30th and 70th percentiles, has shrunk significantly. As figure 2 shows, while other advanced economies have experienced a middle-class squeeze as well, the downward trend in the United States has been exceptionally dramatic.

The failure to generate good jobs has significant economic, social, and political costs. On the economic side, the distributional costs are compounded by the implications for overall productivity and economic growth. Labor market polarization slows down the dissemination of innovation from the more advanced sectors and firms to the rest of the economy that often occurs through the creation of more-productive jobs in the middle of the skill distribution. This deficit of middle-skill jobs may well be connected to the

FIGURE 1

Employment Growth by Occupation and Annual Pay, 1980 to 2019



Source: Census Bureau American Community Survey (ACS) 1980-2019; author's calculations.

Note: Data for 2019 reflects pooled employment and wage earnings from 2017-2019. Sample includes working-ages 16-64, excluding those in the military. Occupations are harmonized across periods and grouped based on the classification scheme developed by Dorn (2009).



general slowdown in US aggregate economic productivity, a fact that is otherwise puzzling given the significant rates of innovation in the advanced sectors of the economy.

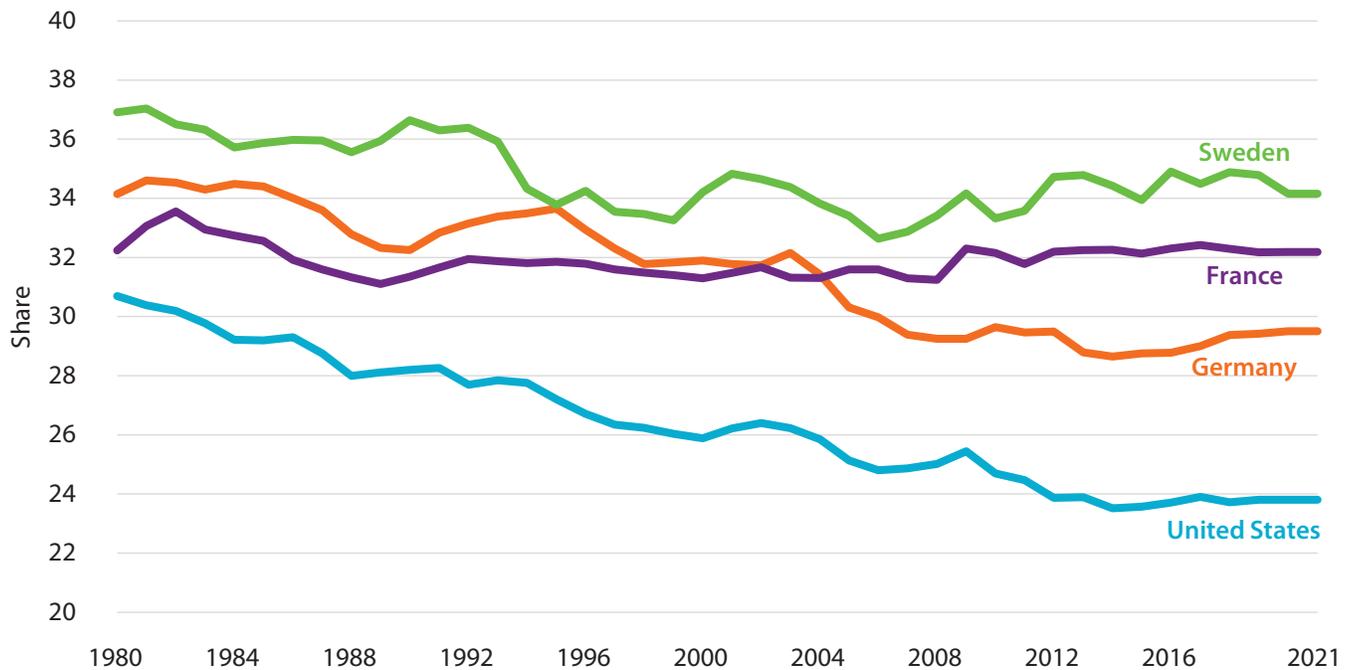
The broader complication with the shortage of good jobs is the undermining of social structures that underpin economic prosperity. Communities where middle-class jobs have become scarce suffer from a variety of social ailments. In his pathbreaking book *When Work Disappears*, sociologist William Julius Wilson (1996) described at length the societal costs of the decline in manufacturing and blue-collar jobs on racial minorities living in urban areas; those costs include household restructuring, addiction, and crime. His analysis applies more broadly, however. More recently, Autor, Dorn, and Hanson (2019, 2021) have studied communities across the entire United States, differentiating them by the degree to which they were affected by import competition with China. Communities where jobs came under greatest pressure from Chinese imports experienced long-term increases in “idleness” among young men (i.e., neither employed nor in school) and a rise in male mortality due to drug and alcohol abuse, HIV/AIDS, and homicide. Job loss also led to an increase in the fraction of single mothers, of children in single-headed households, and of children living in poverty. Finally, in their evocatively titled book *Deaths of Despair*, Anne Case and Angus Deaton (2020) have described the staggering costs in terms of disease and mortality when economic opportunities desert local communities.

These problems get transmitted from one generation to another, with joblessness among today’s adults making joblessness among tomorrow’s adults more likely.

Then there are the *political* consequences of the scarcity of good jobs. There is considerable evidence from a number of advanced market economies that links the rise of nativist populist political movements to adverse labor market developments (see Rodrik 2021 for a review and discussion). Autor et al. (2017) have shown that, in the United States, the China trade shock had a significant impact on political polarization. Holding constant initial political conditions in 2002, districts that experienced sharper increases in import competition were less likely to elect a moderate legislator in 2010. New legislators elected in hardest-hit areas tend to occupy more-extreme positions on the ideological spectrum, especially on the right. Districts initially in Republican hands were substantially more likely to elect a GOP conservative. The China trade shock on local labor markets may have even been directly responsible for President Donald Trump’s electoral victory in 2016. Autor et al. (2017) undertake a counterfactual analysis in which they assume the growth of Chinese import penetration is 50 percent lower than the realized rate over the 2002-14 period. Their estimates for the electoral consequences indicate that a Democrat instead of a Republican presidential candidate would have been elected in 2016 in the swing states of Michigan, Pennsylvania, and Wisconsin, preventing Trump from garnering a majority in the Electoral College.

FIGURE 2

Middle Class Pretax Income Shares in Select Countries, 1980–2021



Source: World Inequality Lab 2021.

Note: Figure shows pretax income share going to the middle 30th–70th percentiles for each country.



Similar results showing an association between labor market problems and the rise of the authoritarian, nativist right have been obtained in several European nations (Colantone and Stanig 2016, 2017; Dal Bò et al. 2018; Guiso et al. 2017).

More broadly, adverse labor market developments weaken support for democracy and foster nativist and authoritarian attitudes. Economic stagnation or decline among the middle classes undermines the set of moral values and beliefs that sustain liberal democracy (Friedman 2005). The association between economic crisis and the rise of fascism in interwar Europe is well known (Frieden 2006). There is evidence that some of the same tendencies may be at play currently. In the United States, individuals located in local labor markets that were more substantially affected by imports from China appear to have developed values that are more authoritarian (Ballard-Rosa, Jensen, and Scheve 2018). Similarly, individuals living in European regions that received more-negative globalization shocks were systematically less supportive of democracy and liberal values and more in favor of authoritarian leaders (Colantone and Stanig 2018). Strain and Veuger (2019) find increases in Chinese import penetration are associated with hardening of preexisting attitudes among white Americans toward immigrants, minorities, guns, and religion. Cerrato, Ferrara, and Ruggieri (2018) argue that the political impact of the China trade shock played out primarily through a cultural backlash: greater disruption of local labor markets produced negative attitudes toward immigrants and racial/ethnic minorities, including Muslims.

In short, bad jobs lead to lagging communities with poor social outcomes (poor health, inferior education, high crime) and social and political strife (populist backlash, democratic malfunction). In the absence of incentives that prompt them to do so, private employers fail to take these costs into account.³ These negative externalities can be substantial—perhaps so great that they threaten the economic order underpinning our form of government. Good jobs, conversely, have enormous positive externalities. The external costs associated with the failure of the private sector to create good jobs provide a motive for industrial policies that is broadly similar to the traditional economic case for such policies.

The case for industrial policy rests on two fundamental rationales: externalities and coordination failures. Externalities are costs or benefits that producers' actions create for society at large and that they do not pay or receive a reward for, at the margin. Learning, technological, and agglomeration externalities are at the core of the traditional case for industrial policy. These externalities occur when, for example, a firm invests in new technologies that other firms—those that are nearby, suppliers, or direct competitors—can benefit from without having to pay for them. Since the social benefit of such investments exceed the benefits to the firm itself, they would be under-provided in the absence of explicit encouragement. The optimal policy here would be the payment by the government to the firm of a Pigovian subsidy to internalize the externality, equal to the difference between social and private marginal benefits of research and development (R&D).⁴

For policymakers, national security has always loomed large in arguments for industrial policy. Alexander Hamilton argued in his 1791 report that supporting manufactures “will tend to render the United States, independent on foreign nations, for military and other essential supplies.” The national-security case for industrial policy can also be made in terms of externalities. A strong national defense, and in particular a dependable supply of critical inputs, benefits all firms in an economy. Individual firms may not sufficiently internalize these objectives, prioritizing the benefits of offshoring and outsourcing. Government inducements may be needed to ensure there is adequate domestic capacity in critical products that foreign nations (i.e., China) may choose to withhold or raise prices on to extract geopolitical leverage.

Good-job externalities can be thought of in similar terms, though the external effects in question may be local rather than national. Good-jobs externalities exist when the private costs to firms of hiring workers with good pay, benefits, and working conditions exceed the social costs, or alternatively, when the private benefits to employers of creating these good jobs fall short of the social benefits.⁵ The considerations discussed earlier suggest such gaps can be quite significant.

Coordination failures arise in the presence of strong scale economies (that are in turn due to either declining marginal costs or large fixed costs). A firm considering making a large investment in a particular region will need to ensure that there is adequate infrastructure, high-quality suppliers nearby, and the requisite specialized skills in the local workforce. But these critical inputs may not be available in the absence of the investment from the firm in the first place, because they would not be profitable on their own. A simultaneous package of investments in all these areas would yield profits to all, though none makes commercial sense in the absence of other complementary investments. Timing discrepancies—firms need specialized skills today for which investments ought to have been made yesterday—add a further layer of complications. In such cases government agencies have the potentially important role of coordinating investments by the different parties involved.

In principle, coordination failures do not require government financial assistance to be resolved. Subsidies need not be paid since the private investments will more than pay for themselves *ex post*. But the promise of a subsidy—such as a loan guarantee—may be a useful inducement to get the investments started. If the logic of coordination failures holds, the government guarantee will never be called, and no subsidy will have to be paid *ex post*.⁶

While job creation is almost always one of the stated motives of industrial policy, good jobs are rarely targeted specifically. It is typically assumed that increased investments in physical capital or innovation will bear fruit in terms of improved labor market outcomes as well. But such outcomes are not always assured. The evidence reviewed above suggests good-job externalities must play an explicit and much more significant role in the design of industrial policy.

The What: Moving Beyond Manufacturing

The economic rationale for industrial policy is that society benefits when government promotes certain economic activities—implicitly at the expense of others—because those activities are the repository of certain desirable features (i.e., they produce positive externalities). As such, the argument in favor of industrial policy has nothing to do with industry *per se*. But, as the label makes clear, industrial policy has historically been regarded as synonymous with support for manufacturing. Since Hamilton’s day, manufacturing has been viewed as special—as a source of positive externalities, dynamism, innovation, and as a growth engine for the entire economy. There is good reason for this belief. Modern economic growth started with the Industrial Revolution. And, while advanced economies have become postindustrial, to this day manufacturing plays an outsized role in R&D and innovation for the economy as a whole (Fuchs et al. 2022).

However, manufacturing today is no longer a plentiful or reliable source of good jobs, and neither is it likely to become so in the future, as I will argue below (see also Lawrence 2022). These considerations require us to go back to the original rationale for industrial policy and reconceive it in a broader sense, deemphasizing the role of manufacturing *per se*.

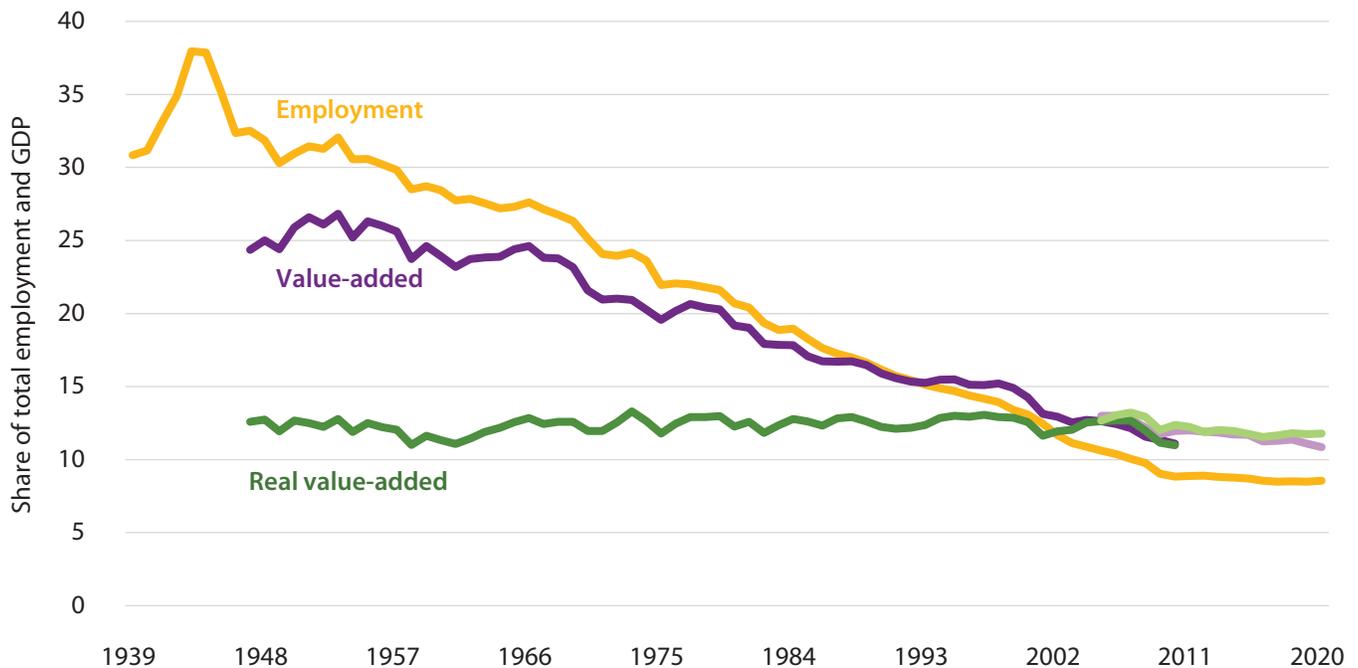
Remarkably, the share of manufacturing in US GDP at constant prices has remained quite stable since the end of World War II (figure 3). In real terms, the United States has not experienced any deindustrialization in output terms. But because productivity has advanced more rapidly in manufacturing than it has in the rest of the economy, the relative price of manufacturing has fallen and the share of manufacturing at current prices has come down steadily from 26 percent in the early 1950s to around 11 percent currently. There has been an even more striking reduction in the share of jobs generated by manufacturing. The proportion of employment in manufacturing has declined from more than a third during World War II to less than 9 percent at present. Manufacturing presently supplies less than one in ten total jobs in the US economy. Since 1979, the total number of jobs in goods-producing sectors has fallen by 4 million, while jobs in services have increased by 59 million (figure 4).

The decline in US manufacturing employment is closely linked to patterns of technological change, which have been skill- and capital-biased. Since the late 1980s the labor share in US manufacturing has fallen while holding generally steady in the service industries (Acemoglu and Restrepo 2019). It is reasonable to suppose that global competition from countries, such as China, with low-cost labor has stimulated labor-saving innovation in manufacturing that has remained in the United States. Both globalization and autonomous trends in innovation would appear to have played a role in driving employment deindustrialization.

I emphasized above the importance of good-job externalities. Secure, well-paid jobs in manufacturing have

FIGURE 3

U.S. Manufacturing Shares of Total Employment and GDP, 1939–2020



Source: Bureau of Economic Analysis (BEA) 2022; Bureau of Labor Statistics (BLS) 2022; Groggingen Growth and Development Centre (GGDC) 2014; Timmer et al. 2015.

Note: Historical value-added series are sourced from GGDC database based on Timmer et al. (2015), which estimates manufacturing's share of total value added aggregated across all observed sectors, where real series are based on constant 2005 prices. Recent series for 2005–2020 shown as lighter shaded lines reflect BEA estimates of real and nominal contributions of manufacturing to total GDP, where real series uses constant 2012 prices. Due to sector-level adjustments, aggregate totals underlying GGDC shares are not fully consistent with national accounts aggregates.



traditionally served as a vehicle for broadening the middle class. From this perspective, employment deindustrialization is especially significant: it raises the question of whether the traditional focus on manufacturing can be effective in generating significant quantities of good jobs when the employment share has already fallen to less than 10 percent. The answer depends on the likely future prospects for manufacturing employment. If successful industrial policy can boost manufacturing employment alongside manufacturing output and innovation, we can remain reasonably optimistic about the efficacy of traditional industrial policies. If not, we need to look to other parts of the economy and broaden the definition of industrial policy.

The experience of other countries provides an important clue regarding the prospects for manufacturing employment. The precarious state of US manufacturing is often compared to the apparently more encouraging situation in some countries in East Asia where policies and other factors are said to have been more advantageous. Yet the comparative experience provides very little hope that employment deindustrialization can be reversed. In fact, the picture other countries paint is rather pessimistic for the prospects of manufacturing employment.

Figure 5 summarizes manufacturing trends in eight comparator countries: China, Japan, Malaysia, Mexico,

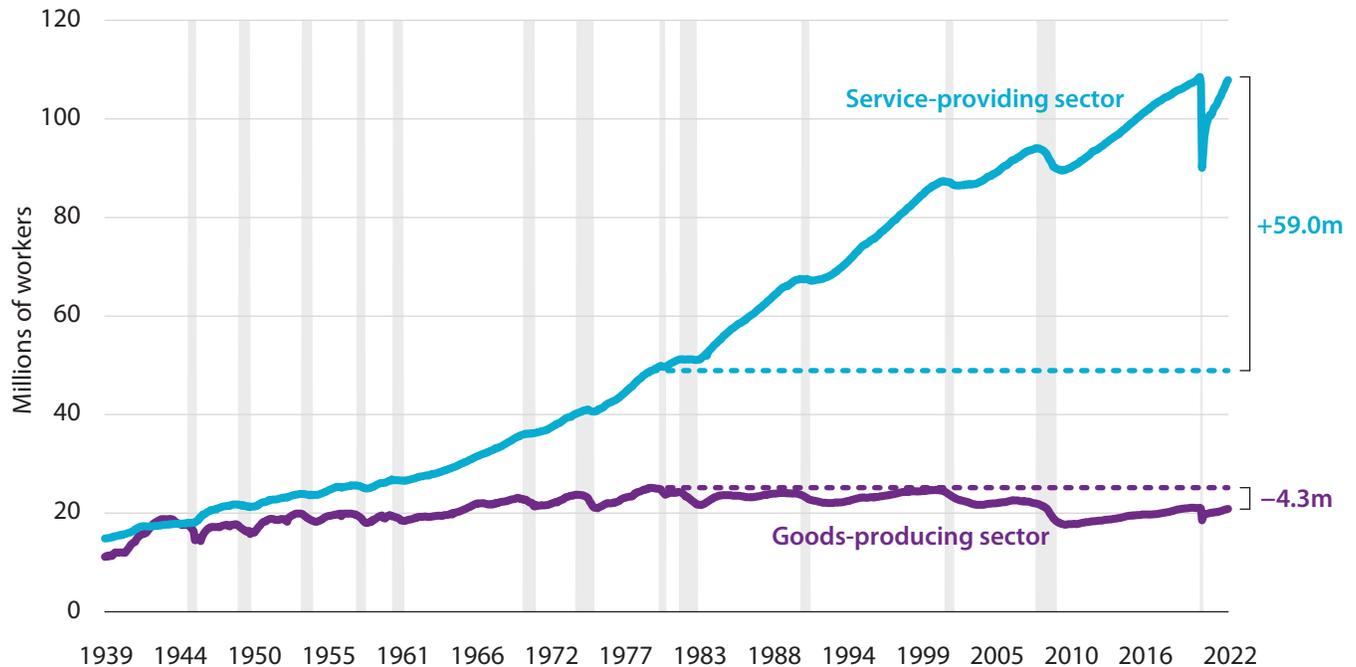
Singapore, South Korea, Taiwan, and Turkey. The chart for each country shows manufacturing employment shares as well as manufacturing value-added shares in GDP at constant prices. Several of these countries have significantly raised real manufacturing shares in the economy in recent decades, with Japan, South Korea, Malaysia, and Taiwan in particular standing out. Nevertheless, none has managed to prevent a noticeable decline in manufacturing employment shares.

South Korea is an interesting example. The output share of manufacturing in the economy has risen (in real terms, at 2015 prices) from 20 to 29 percent, which is an increase of nearly 50 percent. Meanwhile the employment share of manufacturing has fallen from 26 to 17 percent. As South Korean manufacturing has become more productive and more competitive in global markets, it has become significantly less intensive in labor. In fact, the adoption of labor-saving technologies such as automation and robots have been an important cause for South Korea's continued manufacturing success. The same process appears to be playing out in China as well, as Chinese manufacturing firms react to rising domestic labor costs.

In theory, it is possible that the adverse employment consequences of the substitution of capital for labor could be offset by increased scale (an expansion of manufacturing

FIGURE 4

Private Employment in Goods and Services Sectors, 1939–2022



Source: Bureau of Labor Statistics 2022.

Note: Gray bars indicate recession periods.



output as a whole). But there does not seem to be a single country where this has actually happened.

The bottom line is that employment deindustrialization seems to be a universal phenomenon. In fact, greater success in manufacturing seems to be associated with the adoption of labor-saving technologies that contribute to the fall in employment shares. We simply cannot presume that conventional industrial policy, focusing on manufacturing, will serve, as a by-product, the objective of increasing the potential supply of good jobs in manufacturing. Therefore, the remit of industrial policy will have to be broadened significantly beyond manufacturing, to encompass firms in service sectors serving primarily local or domestic markets. These firms will generally be smaller and significantly more diverse in the types of support they require. The conduct of industrial policy will have to be modified accordingly.

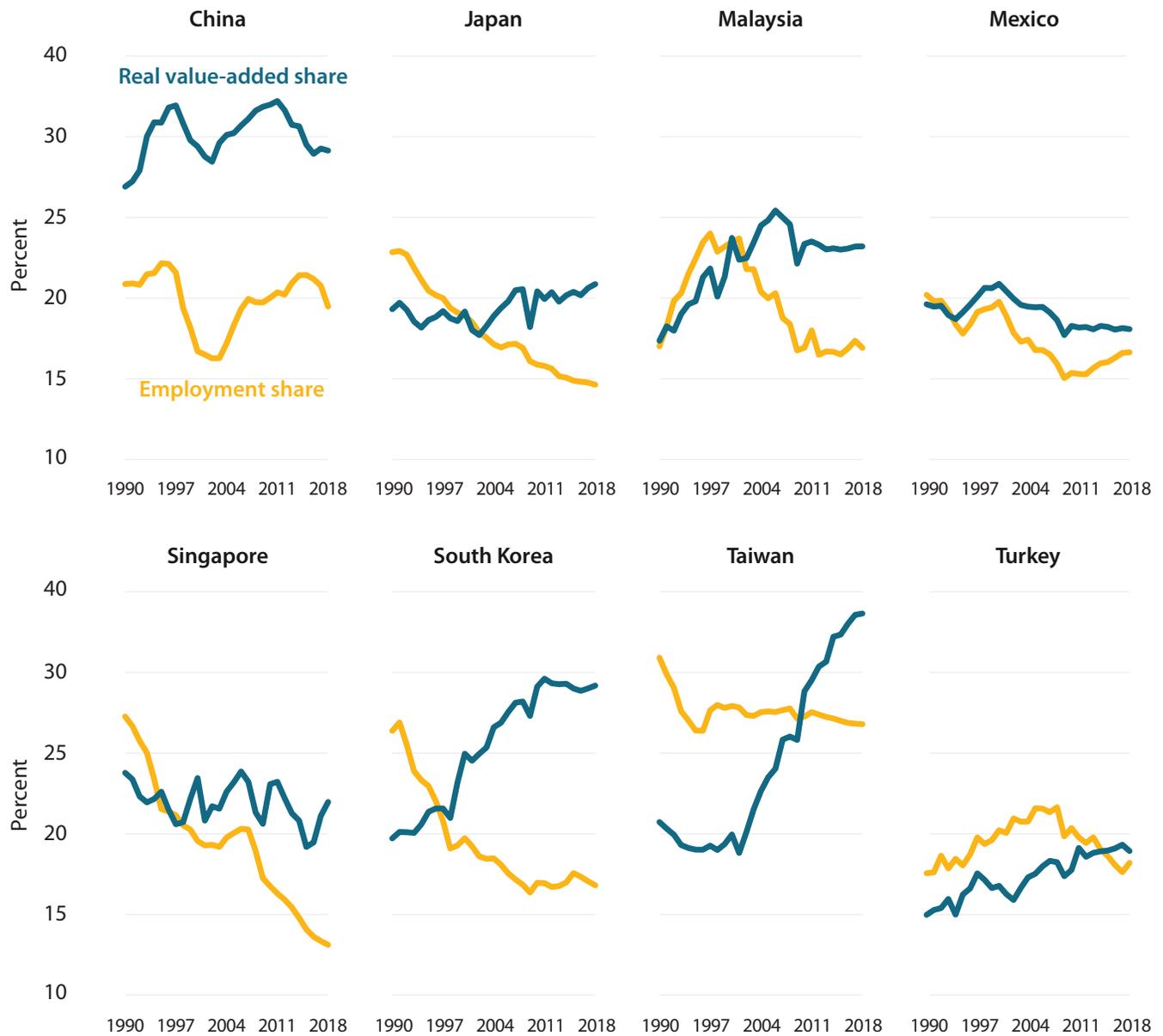
Can productive development policies typically applied to manufacturing also be appropriate for service sectors such as retail, hospitality, education, health care, or long-term care? We have less experience and evidence on the benefits of sectoral policy in these areas. But many service activities can benefit from complementary investments in new work practices, job-specific training, technologies that complement and empower workers, better-tailored regulations, and improved organizational culture. Public-private initiatives that promote such investments can enhance labor productivity, enabling the provision of better jobs. See box 1 for a discussion of an important case: long-term care.

The How: From Top-Down Subsidies to Collaborative, Customized Assistance

In his “Report on the Subject of Manufactures,” Alexander Hamilton (1791) considered different policy instruments for promoting industrialization: import duties, import prohibitions, and export prohibitions on key material inputs to manufactures, among others. But he especially favored “bounties” (i.e., subsidies) as the most direct means to encourage new industries without raising domestic prices. He anticipated economists’ contemporary understanding of Pigovian subsidies as the most appropriately targeted instrument when targeting the internalization of externalities. He was keenly aware of the practical difficulties. “It is a familiar objection to [bounties], that they are difficult to be managed and liable to frauds,” he wrote. It would “be necessary to guard, with extraordinary circumspection, the manner of dispensing them.” But such difficulties, he noted, were not prohibitive: “[They are not] sufficiently great to countervail the advantages of which [bounties] are productive, when rightly applied.”⁷ (Hamilton argued that the subsidy to manufactures should be financed by import duties on manufactures, whereas contemporary economic theory would favor a broad-based tax.)

A Pigovian subsidy is the appropriate instrument when information is plentiful and uncertainty is limited. The

FIGURE 5
Manufacturing Trends Across Countries, 1990–2018



Source: Groggingen Growth and Development Centre (GGDC) 2021; de Vries et al. 2021.

Note: Data is sourced from GGDC's Economic Transformation Database based on de Vries et al. (2021). Real value-added shares reflect each country's manufacturing share of total GDP in constant 2015 prices.



first-best response to a good-job externality is to subsidize employers for creating good jobs. However, this assumes that policymakers confront a clear-cut externality of known magnitude and well-established elasticities of demand and supply. Things get murkier when there is uncertainty along these dimensions. In a dynamic environment with multi-dimensional uncertainty, subsidies will generally fall short and be dominated by different policy tools.⁸

A specific example of this arises in the case of environmental externalities where there is uncertainty about the costs and benefits of attaining a particular target (say,

clean air) due to technological or other imponderables. In a classic article, Weitzman (1974) showed that quantity targets may dominate price instruments (such as a Pigovian subsidy) under these conditions. A subsidy minimizes the costs of achieving a certain target, but creates the risk that the target may be missed (because firms do not respond as vigorously as anticipated). Quantitative targets, on the other hand, achieve the requisite target (by assumption), but potentially produce greater economic cost than might have been necessary. When the risks of missing the socially optimal target—such as reducing air pollution by the mandated

BOX 1

Good Jobs in Long-Term Care?

Consider the care economy, and long-term care specifically. This is a sector where employment could increase rapidly in future years as the population continues to age and demand for in-home or assisted living arrangements increases. Yet there is a shortage of workers, due to low wages and other undesirable characteristics of the job (Poo and Berger 2022; Stevenson 2018).

Much of long-term care work is done in homes (through agencies that provide the caregivers or through self-employed caregivers) or in assisted living or retirement communities where, unlike hospitals or nursing homes, regulations are weak. In such settings, remuneration and work conditions have traditionally been very poor—characteristics that epitomize bad jobs. Employees are mostly women and disproportionately are people of color. Long-term care workers are typically regarded as performing low-skill jobs and are not viewed as “real members of the care team” (Osterman 2019). Home-care aides are unable to undertake simple tasks (such as changing dressings or bandages, or applying nasal or eye drops), so that “it is difficult to increase the productivity of aides in a way that might underwrite compensation gains” (Osterman 2019). In many ways, long-term care is a test case for the idea that sectoral policies organized along the lines of industrial policy can boost good jobs.

As Osterman notes (2019), there are three ways in which jobs in long-term care can be improved. First, the government can regulate and impose standards (such as high minimum wages). Second, reimbursement rates from Medicaid and Medicare can be increased, in the hope that higher rates show up in increased wages. Third, the productivity of direct-care workers can be raised, allowing the long-term care system to serve patients’ needs better and to reduce costs, generating room for better compensation. While both of the first strategies might be useful, greater productivity is ultimately the most reliable source of better jobs.

Osterman suggests that it might be useful to increase productivity in long-term care through a strategy that is analogous to the deployment of innovations in manufacturing pioneered by Japanese auto producers. This entails a combination of investing in worker skills; providing workers with greater voice, discretion, and autonomy; and giving them more responsibility for the quality of the service. Bishop (2014) notes that, with respect to nursing homes, care workers that are empowered with greater autonomy and decision-making can use their knowledge of residents and patients to customize their services and provide more flexibility (e.g., in schedules, food, and treatment); the same approach can be applied to in-home care and long-term care facilities as well. An important component of the strategy would be the introduction of new technologies that complement caregivers’ skills, such as digital tools that enable caregivers to collect real-time information, and to respond quickly and efficiently to the needs of individual residents.

If long-term care is managed better in these ways, there would be real productivity benefits: lower turnover and burnout on the part of care workers, reduced admissions to nursing homes and reduced hospitalization rates, better management of chronic conditions, and quicker and smoother transitions out of acute-care facilities, in addition to improved customer satisfaction (Osterman 2019).

These changes would require a willingness to experiment with novel work practices and a continuum of efforts—from R&D and the introduction of new technologies for long-term care, on the one hand, to their local adoption, adaptation, and contextualization in specific communities, on the other. Importantly, there is a complementarity between the provision of good jobs (with high wages and job security) and the adoption and successful implementation of these practices by workers (Bishop 2014). Workers who believe they are remunerated well and are treated with dignity and respect are more likely to respond positively to additional responsibilities and to perform at a high level.

amount—outweigh the risks of imposing too large a cleanup cost on producers, quantity targets are preferable to Pigovian subsidies. In the good-jobs context, the analogous argument would be that employment targets may be preferable if the risk of failing to generate a sufficient number of good jobs in a particular community dwarfs the risk of imposing too high a burden on individual firms.

Uncertainty also increases the dimensionality of the policy space. In the standard conception of externalities, there is a single quantity (level of employment), with an associated market price (wages), that is responsible for the generation of the externality. The appropriate intervention consists of directly targeting that price (or quantity), and doing no more than that. But when there is uncertainty about behavior, technology, and the effectiveness of different policies, optimal policies—in the second-best sense of the term—will extend over multiple margins of intervention and several different types of policy instruments. For example, policymakers may combine employment incentives with training, technology, and marketing assistance to firms; investments in infrastructure; and so on. The

direction of future technological change itself can become a target for policy. Moreover, learning about what works and what does not work becomes an integral part of the policy process. Mechanisms of feedback from firms to public authorities is critical to the regulatory apparatus. The relevant policy space is of much higher dimensionality.

Finally, an additional problem with standard regulatory remedies in the present setting is that they postulate clear goals (or objective functions, in economics jargon). As uncertainty increases, it becomes difficult to specify in advance not only the costs and benefits of regulation, but also its precise objectives. The government and its agencies will often have to go further and negotiate improvement targets with individual firms or clusters of firms. What is a good job in a particular community? How many of those jobs can be reasonably created? How will technological and other firm-level choices influence job creation? What are the complementary policy levers that are available? How can that set of instruments be expanded? These are necessarily local, contextual questions. They can be answered, and periodically revised, only through a customized, iterative process

TABLE 1

Traditional Industrial Policy and Proposed Approach

	Traditional Industrial Policy	Proposed Approach
Externalities targeted	R&D, innovation, learning externalities; coordination failures in investment	Good-job externalities in local economic development and direction of innovation
Sectors	Manufacturing, tradable sectors	Largely services (in addition to manufacturing)
Firms	Large, globally competitive firms	Small and medium-size firms
Assumptions about the government	Governments can identify market failures ex ante and are sufficiently insulated from capture	Widely dispersed knowledge about location and magnitude of market failures; governments face substantial uncertainty; endogenous state capacity
Types of incentives	Tax, credit subsidies	A portfolio of business services, including marketing, management & tech assistance, customized training, infrastructure, seed capital/loans for directed technologies
Application of incentives	Fixed schedule of incentives, except for incentive packages for large firms which may be negotiated	Customized to firms' needs and adapted to context
Selection criteria	Pre-specified	Voluntary buy-in and participation
Conditionality	Hard; rigid ex-ante criteria	Soft; provisional, open-ended and evolving
Relationship with recipients	Arms' length	Collaborative, iterative; active project management



of strategic interaction between public agencies and private firms. This process does not quite fit the familiar, principal-agent framework of rulemaking which assumes that goals and social benefits must be known in advance if public action is to be effective and accountable.⁹

All these problems are particularly severe in the case of services and when working with small and medium-sized enterprises with very heterogenous needs. Under extreme uncertainty neither the policymaker nor employers have reliable information on the possibilities and costs of creating good jobs, and have only vague conjectures regarding the possibilities that may open upon further investigation. Incentivizing desired private sector responses under these conditions requires the creation of an information exchange regime that ties ongoing specification of goals—here, good-job creation—to continuing exploration of new solutions. It would be based on provisional goals, iterative benchmarks, collaborative decision-making, monitoring, and revision of goals and instruments in light of new information. The contours of public action would be shaped over time by the needs and requirements of different types of firms and

communities. Under this conception, the government is not presumed to know where the market failures are beforehand and, therefore, does not determine ex ante what the specific policy instruments are. Industrial strategy consists of a collaborative process of discovery involving business and agencies of the state, where the objective is to identify the constraints and opportunities over time, and to design interventions appropriately. As learning takes place, policies are revised, refined, and sometimes reversed.

This kind of industrial policy diverges sharply from standard conceptions of top-down, arms' length, ex ante regulation that is built in to the Pigovian subsidy model. It reflects ideas that have developed over the past couple of decades into a new conception of industrial policy (e.g., Evans 1995; Fernández-Arias et al. 2016; Ghezzi 2017; Hausmann, Rodrik, and Sabel 2008; Rodrik 2007, 2008; Sabel 2007). It bears close similarity to experimental governance, as explored by Victor and Sabel (2022) for climate policy. Some of the key differences from the traditional model are summarized schematically in table 1, and will be discussed further below.

The Proposal

I have emphasized in the previous discussion that public action must address the good-job externalities associated with employment, production, investment, and technology choices that firms make, and that such action must move beyond manufacturing and proceed in the face of deep uncertainty. These considerations highlight two key areas for public action. At the local level, we must encourage the proliferation and expansion of a new type of collaborative business development arrangements that explicitly target good-job creation within communities. At the federal level, we must launch an R&D and innovation program, along the Defense Advanced Research Projects Agency (DARPA) and ARPA-E(nergy) models, that focus on developing new technologies that are labor-friendly (i.e., complementary to workers with ordinary skills) rather than those that are labor-displacing: ARPA-W.¹⁰

Since ARPA-type organizing principles can be generalized and applied to local initiatives as well, I will begin with a discussion of the federally-focused program. As I hope will become clear, the two sets of initiatives are different in scale and scope, but they are connected both by their objective—expanding the supply of good jobs—and by a new approach to industrial policy that is collaborative and iterative rather than top-down and prescriptive. The successful undertaking of these tasks does not rely on unrealistic assumptions on policy capabilities. These initiatives can be built on arrangements that are tested and that already exist at the local and national levels.

A Federal Innovation Initiative to Promote Employment-Friendly Technologies

Initiatives to incentivize firms to create good jobs and provide them with the complementary inputs to facilitate doing so, in the manner I will discuss in the next subsection, will not be very effective if technological progress continues to displace workers with middle skills and education. To ensure that technology helps rather than hampers inclusive prosperity, a key plank of a good-jobs strategy must be a parallel national effort to steer technology in a more labor-friendly direction. This could be viewed as a moonshot mission, in Mariana Mazzucato's (2021) sense of the term.¹¹

The conventional narrative around the labor market implications of new technologies goes something like this: “New technologies make rapidly increasing demands on skills needed on the job, and workers need to adjust through increased education and continuous training.” This perspective treats the direction of technological change—whether it augments or replaces labor—as essentially exogenous and out of our control. It is workers and society at large that have to adjust to technological change—not the other way around. This is a curiously one-sided view. As the late Anthony Atkinson emphasized, the direction of technological change is not autonomous and cannot be left to firms and innovators alone (Atkinson 2015). This argument has been picked up more recently by Daron Acemoglu (2019; see also Korinek 2019, and Rodrik and Stantcheva 2020).

The direction of technological change responds to economic incentives and prevailing social norms. First, and most directly, government-funded and government-directed innovation programs make decisions about what kind of innovations to promote. Defense-related and green technologies are clear examples, promoted by DARPA and the much smaller ARPA-E, respectively. Employment-friendly technologies—those that augment rather than replace labor—could be part of those priorities, though they are not at present. Second, private sector innovation incentives can be skewed because of prevailing financing methods or policies. Venture capital, for example, naturally seeks areas where the returns can be capitalized relatively quickly by investors. This may exclude innovations where the gains are longer term or are reaped by society at large (Lerner and Nanda 2020).

Third, prevailing tax regimes shape innovation incentives. Most advanced economies subsidize capital formation (through depreciation allowances and other incentives) and tax labor (through personal income taxes and labor charges). An unintended consequence of the tax system is to induce firms to economize on labor by investing in machinery, to an extent that may be socially suboptimal (Acemoglu, Manera, and Restrepo 2020). Fourth, global competition also alters innovation incentives. Increased competitive pressure from labor-abundant, low-wage countries has accelerated labor-saving innovation in the advanced countries, as I mentioned earlier.

Fifth, beyond economic incentives, there are informal norms that guide innovators' decisions. The high-tech community often operates under a shared set of values and expectations with respect to what is a desirable direction for technological change. Groupthink is aggravated by the very

high concentration of venture capital funding in a small number of firms and cities (such as San Francisco, Boston, and New York City). Such norms might be amenable to change as society begins to attach specific value to employment-friendly technologies. The growing ecological consciousness of households and firms provides an apt analogy.

Finally, the direction of technological change also depends on the balance of power between employers and employees. When workers have a say in the workplace, management has to get buy-in from them before major technologies are deployed and work is restructured. This can result in a modern version of Luddism—aversion to any kind of innovation that appears to threaten jobs. But it can also be a useful counterweight to adverse incentives in the system encouraging too much automation or the adoption of what Acemoglu, Manera, and Restrepo (2020) call “so-so technologies.”

In short, the direction of technological change, in addition to its rate, depends on a wide range of factors, many of which could be influenced by societal and governmental decision-making. It might be possible to direct technology so that it better serves the existing workforce’s needs, in addition to preparing the workforce to match the requirements of technology.

Acemoglu and Restrepo (2018) have argued that it is possible to countervail present technological trends and push innovation in a direction that creates new, labor-absorbing tasks. They cite three areas for potential application. First, they suggest artificial intelligence (AI) could be used in education in order to create more-specialized tasks for teachers, personalize instruction for students, and increase effectiveness of schooling in the process. Indeed, computer-assisted learning software that automatically adjusts content to students’ needs is one of the most promising avenues for productivity enhancement in education (Biasi, Deming, and Moser 2022). Pairing such software with the human connection and support that only teachers can provide could produce greater demand for customized instruction as well as higher-quality education.

Second, they note a similar potential in health care. AI tools can significantly enhance the diagnostic and treatment capabilities of nurses, physicians’ aides, care workers, and other medical technicians, allowing the less-skilled practitioners to perform tasks that only physicians with many more years of professional education have traditionally undertaken. Third, Acemoglu and Restrepo (2018) mention the use of augmented and virtual reality technologies in manufacturing, enabling humans and robots to work together in performing precision tasks, rather than the latter replacing the former. Such technologies are based on smaller, more-nimble robots that also enable greater customization of production in response to specific customer needs. Indeed, companies such as BMW and Mercedes are building their automation plans around human work, which they have found allows both greater reliability and more customization in production.

These considerations suggest some broad directions for policy. In particular, one can imagine the launch of a

national innovation effort along the ARPA model with an emphasis on the development of labor-friendly technologies such as those discussed above—technologies that complement rather than displace workers who have an intermediate range of skills and education. Like DARPA and ARPA-E, this new innovation program—ARPA-W—would target the development of new technologies at the frontier of science and technology, where solutions are unclear and many efforts will necessarily fail. But it would focus on technologies that are best suited to complement human labor and ingenuity, and not on technologies that are potentially critical for national security. The appropriate quantitative targets and benchmarks for such an effort are yet to be developed, and would have to be part of the initiative. But an initial checklist might prioritize technologies that complement and augment what workers with intermediate-range skills can do, expand the range of tasks they can perform, increase their ability to customize services to specific needs and types of customer demand, and increase their (labor) share of value added in production.¹² Many of these yardsticks can be measured and monitored. The overarching objective would be to allow workers to do what they cannot presently do, instead of displacing them by taking over the tasks that they already perform.¹³

To see the operational implications of such an approach, it might be useful to review the governance mechanisms of the DARPA model. DARPA’s projects are managed by program directors—recruited from academia, industry, or elsewhere in government for three- to five-year terms with the possibility of renewal—who play a key role in the collaborative setting and revision of goals. DARPA treats goals at every stage in the organization of research as provisional, or subject to revision in light of experience. Program directors are initially hired largely on the basis of their promise in giving direction to an emergent area of investigation. They develop program goals in consultation with scientists and businesses. If approved, a program would consist of a number of different projects over several years. Concrete proposals, many of them submitted by partnerships among several organizations, are developed and executed in the same iterative manner, with goals open to recurrent challenge and revision. Critically, program directors and award recipients agree on precise milestones that will structure relationship between the agency and awardee partners. Milestones are not rigid: they are altered or deleted in a large proportion of the projects, signifying a change in the direction of the research investigation.

Awardees must provide quarterly progress reports, which the agency rates with a traffic light system: red for projects that missed a critical milestone and are at risk of failing, yellow for projects that missed a milestone but can be expected to recover, and green for projects that are on track to reach their goals. Project budgets can be increased (if interim results are especially promising) or decreased (when key milestones are persistently missed). Red ratings—or the anticipation of them—set off an intensification of the monitoring process (routine site visits, conference

calls, meetings, and written analysis of problems and possible solutions by which program directors keep abreast of project developments). If recovery efforts fail, the program director sends an “at risk” letter warning of the possibility of termination, usually between one and two quarters before a project is in fact ended.

The DARPA example illustrates in detail the institutional mechanisms through which public entities can orient, coordinate, and discipline collaborative investigation in an environment of extreme uncertainty. These mechanisms could be readily adapted to the ARPA-W proposed here.¹⁴ Indeed, the DARPA model can be seen as proof of concept that the new style of industrial policy discussed in this essay is not only feasible, but is already in existence. Moreover, while a DARPA-style innovation program may seem quite distant from the local and regional industrial incentives I will discuss next, the broad governance principles that shape DARPA’s operation are in fact not too dissimilar from those that prevail in successful public-private collaborative arrangements at the local level. I turn to those next.

Local and Regional Industrial Policies

When the husband-and-wife team of James and Deborah Fallows (Fallows and Fallows 2018) flew around the country in their single-engine prop airplane to survey the national economic landscape in the aftermath of the China shock and the global financial crisis, they discovered a range of local experiments in economic development that had many of the features of the new industrial policies described above. The cities they visited had been ravaged by a variety of shocks: “For Greenville and the surrounding communities of the Upstate [South Carolina], it had been the rapid loss of the textile companies that even in the early 1990s had been major employers. For St. Marys and its environs in the coastal Georgia pinelands, it was the sudden disappearance of the region’s dominant industry—followed, fortunately and thanks mainly to Georgia’s political pull, by the arrival of the U.S. Navy. For northeastern Mississippi, the departure of low-wage workshops like the toilet-seat factory and blue jeans plant compounded economic and social problems that were decades—even centuries—in the making.” But each of these areas had found ways of creating public-private partnerships that rebuilt downtowns, created parks and cultural centers, reinvigorated training programs, and promoted new businesses and employment creation. “The phrase ‘public-private partnership’ refers to something real,” they wrote, somewhat to their surprise. James Fallows continued, “Through the years, I had heard about ‘public-private partnerships’ but had thought of this as just another slogan. If it meant anything at all, it was probably a euphemism for sweetheart deals between big government and big business—the ‘public-private partnership’ to build the latest fighter plane, for instance. In successful towns, people can point to something specific and

say, ‘This is what a partnership means.’ In Greenville, South Carolina, the public school system includes an ‘Elementary School of Engineering,’ in a poor neighborhood. The city runs the school; local industries including GE, BMW, and Michelin send in engineers to teach and supervise science fairs, at the companies’ expense. In little Holland, Michigan, a large family-owned scrap-recycling company works with the state correctional system to hire ex-convicts who would otherwise have trouble reentering the work force. In Fresno, California, a collaboration among the city, county, and state governments, the local colleges and universities, and several tech start-ups trains high school dropouts and other unemployed people in computer skills” (Fallows and Fallows 2018).

The specifics differ, but in each of these cases these partnerships succeeded in engineering complementary investments in the workforce, infrastructure, business incentives, public spaces, and the quality of life. Indeed, by forming coalitions of businesses, workers, and agencies to collaborate towards shared goals, they were experiments that bore significant similarity to the type of industrial policy I have described above, even if they were designed less self-consciously. Their overseers were practical men and women responding to immediate challenges. “Had a politician labeled [this strategy] ‘picking winners’ or ‘industrial policy,’ it would have been stillborn,” remarks James Fallows. But “as a series of ‘public-private partnerships,’ it is a source of civic pride” (Fallows and Fallows 2018).

In a similar vein, Tim Bartik (2020), a long-time observer and analyst of local business incentive programs, has argued that policies that work best to enhance local employment are those that focus on the specific needs of firms rather than on subsidies or tax incentives. He finds that “public services to businesses, such as customized job training or business advice or infrastructure,” can be more effective and much less costly per job actually created than subsidies and tax incentives. I argue that a similar approach is a more efficient method of creating good jobs. Because they are customized, such programs also need state and local agencies to work closely with firms and a range of other partners in the community in order to be devised and delivered appropriately.

Many of the examples that Fallows and Bartik describe come from manufacturing. But the general principles also apply to service sectors on which productive jobs programs will need to focus. Economic transformation requires setting goals; partnering with firms, workers, training facilities, and community groups; mobilizing resources and inputs; and collaborating in a cumulative, iterative process toward those goals.

More concretely, we can envisage the enactment of federal framing legislation that allocates funds and promulgates general principles for the operation of local good-jobs program along the lines sketched below. The approach would be similar to the American Rescue Plan “challenges,” where \$3 billion was allocated to a small number of “challenge” programs, with regional and good-jobs challenges being the two largest ones. Under these challenges, local

groupings are invited to submit bids to receive funding from Washington. As proposed here, the legislation would empower existing state and local agencies as well as new local partnerships formed for this specific purpose to act as organizational hubs for federal-supported initiatives. The call would be open to local officeholders (mayors, say) as well as ad hoc coalitions of civic organizations or public-private coalitions. An important objective here would be to incentivize and mobilize local groups to take the lead, via the carrot of federal financial resources. Fostering a certain degree of competition among different groups of civic patriots to be selected to receive financial support from the federal government might act as a useful counterweight to the inertia of existing power structures. Participation by worker and community organizations would be essential both to prevent firm capture and to ensure appropriate coordination among service providers down the line.

These local counterparts (policymakers) might start by establishing an ambitious, open-ended outcome, such as the creation by a certain date of X number of good jobs. Good jobs can be operationalized provisionally using any of the metrics mentioned previously, or through indicators selected locally. If selected by the federal program, policymakers would announce a portfolio of federally-supported public services and inputs—ranging from customized training and tax incentives to infrastructure and technology assistance—to which firms willing to contribute to that outcome would have access. The policymakers would also designate a full-time economic development official and supporting staff tasked with managing the program. The official would play the role of the program director in ARPA-type agencies. Ideally, the official would have the high-level political support needed to work with diverse local agencies and coordinate their activities so as to respond to opportunities and participating firms' needs in a timely fashion.¹⁵

Firms that receive public assistance would be obligated to make plans to achieve the goals and to regularly report their results. They would be subject to soft conditionalities. In return for public services, firms would be asked to make provisional commitments on specific quantities of good jobs they will create at different qualification levels (i.e., low-salaried employees, medium-salaried employees, etc.). Firms would be encouraged to pool proposals when they make use of common inputs—as would be the case for workers with particular skills or infrastructure. Other conditionalities might be included as well. A firm might be asked to work with local suppliers to improve upstream management or technological capabilities. Or a firm that is considering outsourcing part of its production to a foreign country might be asked to delay doing so for a number of years, in case productivity improvements at home render those plans unnecessary. The firm could be encouraged to arrange for additional training for some of its employees or implement new complementary technology to make workers more productive.

Penalties for missing targets would aim not to deter infraction of clear rules, but rather to incentivize the

cooperative production of the information that would allow more-refined (and more-realistic) goals and standards to emerge over time. Penalties—exclusion from public benefits—would be imposed only for failure to report or for fraudulent reports, or for persistent failure to achieve results whose feasibility is demonstrated by the attainments of other firms in like positions. As new information is generated, the range and type of policy instruments—the public inputs provided by government agencies—might also be adjusted accordingly. The process would proceed incrementally and require monitoring, to ensure the required revisions in goals and instruments are undertaken.

A benefit of these voluntary arrangements over the medium term might be the development of an inventory of good practices—a repertory of contextualization measures variously suited to a wide range of settings—that can eventually guide application of the good-jobs strategy to a larger set of firms, cutting the costs and increasing the chances for early successes of broader coverage. Put differently, the initial, selective projects might serve as a pilot program for a new system of regulation that extends the formal obligations of firms. As such, these arrangements could come to resemble the European regulatory model, with a uniform requirement of participation but responses highly differentiated by locale.

A deliberate quid pro quo underlies the policymakers' relationship with the private sector in the type of industrial policy I have just sketched out. Governments need firms to internalize good-jobs externalities in their employment, training, investment, and technological choices. Firms, for their part, need access to a stable, skilled workforce; to reliable horizontal and vertical networks of suppliers; and to a variety of public inputs ranging from infrastructure and technology to contractual and property rights enforcement. Meanwhile deep uncertainty precludes simple solutions such as Pigovian subsidies. Instead of open-ended tax incentives or subsidies, the conduct of industrial policy must then rely on the provision of customized public inputs through collaborative, iterative dialog with firms, and with soft conditionality on employment quantity and quality.

Such a framework might seem idealized and impractical, at least in the US context. Nevertheless, there is evidence not only that similar programs already exist, but also that they work much better than throwing tax incentives at investors. The United States already has a variety of programs at the federal, state, and local levels—DARPA-type initiatives, manufacturing institutes, local business incentive/development programs, and sectoral workforce training programs—that exhibit attributes of the design principles just discussed.¹⁶ Many of these are improvised responses by local development officials and civic organizations in response to the challenges of economic decline. Fallows and Fallows (2019) present many illustrations and case studies.

While much of the action with this kind of industrial policy takes place at the local level, the federal government also plays an important role. First, through the framing legislation the federal government would relax local budget

constraints by providing grants to localities that engage in these types of programs. This already happens to some extent such as under the American Rescue Plan challenge programs. But the scale of funding for this kind of industrial policy is small, both in terms of the magnitude of American Rescue Plan itself (\$1.9 trillion) and in relation to other policy initiatives under consideration in Congress, which focus largely on innovation, manufacturing, and strategic industries.¹⁷ Currently the bulk of public resources are spent on business tax incentives.¹⁸ The annual spending on these incentives, mostly at the state and local levels, stands at more than \$46 billion, while the corresponding figure for customized training and business extension services is a meager \$1 billion (Bartik 2019). There is significant scope for ramping up and reallocating federal fiscal resources toward the right kind of programs.

Second, there is a federal role in establishing a national platform for local experiments in industrial policy. These experiments have remained largely under the radar screen of economic policymakers and analysts. There is no systematic evidence base to facilitate information exchange among local policymakers and learning for analysts. A national platform for local industrial policy efforts might help bridge these informational gaps, disseminate local learning and experiences, prevent adverse spillovers across localities (as in the case of tax competition), help scale up industrial policy efforts, and promote better practices through systematic reporting and evidence.

Third, existing federal programs in related policy areas need to be better aligned with local efforts. The federal government maintains a vast infrastructure of initiatives in workforce development, technical advice, credit, and assistance to small firms. These initiatives can provide valuable resources at the local level. But even though the federal government generally encourages experimentation in these areas, it tends to do so within organizational silos that operate on one domain of policy at a time. Even when the silos are designed so as to give control over policy design to the local level, they do so in a single domain. This generally runs counter to the open-ended approach advocated here and makes coordination across these domains more difficult. Overcoming the resulting local fragmentation in policy requires a parallel effort at coordinating the federal initiatives.¹⁹

Fourth, the federal government can establish intermediate institutions that sit in between local development efforts and the national technological mission that is focused on labor-friendly technologies, as described in the previous section. The purpose of these intermediate institutions would be to facilitate the local deployment and diffusion of the fruits of national R&D efforts. Working as incubators, demonstration projects, or technology extension services, such arrangements might help local development officials and employers implement innovations that enable productive jobs. They might disseminate, for example, new AI techniques in education, health care, or long-term care that enhance labor skills. Information flowing in the opposite

direction might help, too. For example, experience accumulated locally with good-jobs policies might help ARPA-W refine its operationalization of labor-friendly technologies.

In Rodrik and Sabel (2022) we proposed a more ambitious national agenda for industrial policies that builds on local efforts. That agenda, which is broader and somewhat different than the one described above, has four steps, which I summarize here.

First, the federal government would commit through legislation or other means to prioritize good jobs as a fundamental challenge that threatens the foundations of our democracy—in the same way that the climate change challenge endangers our physical universe—and requires concerted cooperation between regulators, service providers, and private actors. The federal government would mandate regulators with relevant authority to put in place information-generating regimes that allow for standard setting and revision. The same legislation would create an interagency body to periodically review and prompt improvement of regulatory responses, resolve coordination problems arising from them, and provide funds and authority for voluntary programs in anticipation of an eventual, step-wise extension of regulatory reach.

In the second phase, agencies with authority over areas directly affecting job abundance and quality—vocational training, agricultural and manufacturing extension, standard setting, and the like—would introduce innovation-inducing and contextualizing governance mechanisms where these are not already in place, anticipating the need for support services to help vulnerable actors comply with increasingly demanding requirements. The requirements could take different forms, including specific employment quantity targets and/or standards.

In the third step, where current regulatory authority does not reach, the government would create volunteer, public-private programs to advance the frontiers of technology and organization, and to provide support services (including perhaps subsidies) to help firms move beyond their current low-productivity/low-skill position. These programs would combine services to workers as well as to firms, and they would be customized to the needs of particular sectors and locales. They would adhere to the design principles of innovation-inducing governance; their performance would be accordingly reviewed, and their goals adjusted, by the responsible agency, and then, if problems persist, by the interagency body.

Finally, and assuming voluntary arrangements are successful, the scope of these practices would be gradually made obligatory for nonparticipating firms, starting requirements for submitting credible plans for improving the quality and quantity of jobs together with competitive position by better organization, use of skill and technology, where appropriate in coordination with other firms and institutions. Penalty defaults might be imposed on laggard firms that, despite the availability of support services, persistently fail to comply.

Questions and Concerns

The traditional image of industrial policy that economists carry in their head goes something like this: A group of planners selects certain sectors (e.g., supersonic transport, advanced electronics, or biotech) for promotion on the basis of some ex-ante analysis about the productivity- and growth-promoting properties of these activities. Then they devise financial incentives to encourage investment and innovation in those sectors. These incentives might take the form of cheap credit, loan guarantees, tax incentives, provision of infrastructure, or more-direct subsidies. The programs might also contain a degree of conditionality: state agencies would establish certain performance requirements (physical investment, employment, exports, etc.), and the incentives would be phased out for firms/sectors that do not meet the performance requirements. This is how the industrial policies of successful practitioners such as China, Japan, South Korea, and Taiwan are supposed to have operated.

Critics of industrial policy marshal their objections against the background of this image. The objections take two forms: inadequate knowledge and political capture. Governments cannot pick winners, since they lack the requisite information about which activities are the actual repositories of positive externalities. And even if they had adequate information, once governments get into the business of picking winners, they inevitably become hostage to private special interests, with lobbying and rent-seeking diverting industrial policy from its true objective. The East Asian cases are regarded, grudgingly if at all, as exceptions to the rule. The critics argue that other countries are unlikely to replicate the East Asian experience—because they are democracies, lack “hard states” that are effective and can bend firms to their will, have lower bureaucratic capacity, are more diverse societies, or any number of other differences.

In reality, the practice of industrial policy in East Asia was a lot less top-down than in the traditional image and much more collaborative in the manner described previously. The sociologist Peter Evans (1995) has called that model “embedded autonomy”: state agencies had the independence from private firms to exercise discipline when needed, but they also had plenty of dynamic interaction and collaboration with them to have access to the information necessary to design and revise support policies as needed.

Nevertheless, the critics’ points should make us wary of how much industrial policy can accomplish or the damage it can cause—especially if the skepticism is grounded in actual evidence. But while the criticism is useful to make us think

carefully about the design of industrial policy, it is a lot less decisive than it might seem at first sight.

To begin, the “governments cannot pick winners” argument is largely irrelevant. In the presence of uncertainty, it is inevitable that some projects backed by the government will fail. In this respect, the government is no different from the private sector. The relevant question is whether enough of the projects backed by the government will succeed and produce the social surplus to pay for the failures (and more). What matters is how the overall portfolio does, and not how individual projects do. This is, of course, a point that every investor operating in a high-uncertainty environment, such as venture capital, understands well. It is not unusual for just a few investments in the portfolio to produce very high returns, while hundreds of others fail. A similar result has been demonstrated in programs ranging from Fundación Chile (in Chile) to the US Department of Energy (DoE) green technology loan programs, once they are evaluated as a portfolio (Rodrik 2014).

An important implication is that, under an optimal strategy to maximize social surplus, a public investment portfolio will necessarily include projects that turn out as failures ex post. It would be a sign of inadequate ambition—suboptimal effort—if all individual projects were to succeed. As Thomas Watson, the founder of IBM, is said to have advised his managers, “If you want to succeed, double your error rate” (Rodrik 2014).

The critical criterion therefore is not to avoid mistakes in picking winners, but to ensure that public agencies have the ability to let losers fail. This is where the information-generating mechanisms, iterative reviews, milestones, and so on of “new” industrial policies come in. They are meant to develop and fortify the capacity of policymakers to learn what is working and what is not, and to revise their supports in light of the information. Capabilities to administer such programs effectively do not fall from the sky ready-made. State capacity is endogenous: it is built over time through practice.

Ultimately, it is an empirical matter whether industrial policies succeed. Most contemporary programs of industrial support have some mechanisms of review whereby firms that are not performing in line with program expectations are cut off from assistance. Sometimes firms can fail in spectacular fashion. A much-publicized example is Solyndra, a solar cell company that was the beneficiary of \$535 million in DoE loan guarantees before going bankrupt in 2011. The

company had been visited and praised by President Barack Obama the year before and was showcased as a symbol of economic growth based on green technologies. Solyndra's technology relied on non-silicon inputs; even though the technology worked, the commercial case for the company relied on silicon prices remaining high. Once silicon price tumbled after 2008, the company had no chance to compete with conventional silicon-based photovoltaic cells. It looked like the government had backed the wrong horse. The bankruptcy produced significant political embarrassment and a search for culprits. Solyndra's offices were searched by FBI agents, and the company's top executives were hauled before Congress (where they took the Fifth Amendment).

Solyndra is a case study of what can go wrong when progress—or lack thereof—is not sufficiently scrutinized. Silicon prices had already begun their precipitous decline before the loan guarantee was approved, which should have raised some alarm bells. As Solyndra's financial difficulties mounted, DoE officials justified the losses by arguing that this was common in all start-ups. The company had been selected early on as a showcase for the Obama Administration's efforts and was pushed through the approval process in record time. The administration invested substantial political capital in the company's success, making a potential cut in support difficult to contemplate.²⁰ Moreover, Solyndra's principal private investor was an important fundraiser for President Obama and had access to the White House—making this perhaps an example of political capture. The company spent huge amounts, for a small start-up, on political lobbying (Rodrik 2014).

Even with this bad apple in the cart, one cannot conclude that the DoE's loan guarantee program was a failure as a whole. The program supported scores of companies, many of which weaned themselves off public support and became commercially successful. Industrial policy critics who point to Solyndra as their Exhibit A rarely mention that Tesla was also a beneficiary—receiving a \$465 million DoE loan guarantee in 2009. The company repaid its loan early and became the world's premier company for electric autos and solar batteries.

Systematic empirical evaluation of industrial policies has traditionally been hampered by problems of causal

inference. Statistical issues with mismeasurement, omitted variables, and possible reverse causality plague many of the early studies of industrial policies (Rodrik 2012). Recent studies have produced more-meaningful results, paying careful attention to these issues. The results paint a very heterogeneous picture.

In the United States, enterprise zones, which are generally nondiscretionary and provide tax incentives for all firms operating in a designated geographical area, do not generally have a good record in promoting investment and employment. Wessel (2021) provides a recent exposé of the most recent version of these zones, called Opportunity Zones; Wessel documents how these zones have been open to abuse and manipulation and are mainly a vehicle for enriching well-connected investors.

But subsidy programs with greater discretion, monitoring, and conditionality seem to do better. In their review of place-based policies, Neumark and Simpson (2015) find that the investment and employment response to such policies tend to be positive. They write, "The fact that plants that receive subsidy offers have their applications pass through an initial scrutiny process, and that the targeted outcomes are often heavily monitored and that payment of the subsidy is contingent on the job and/or investment targets being met, may explain why these policies appear more successful in achieving their stated goals than, for example, enterprise zone programs." Slattery and Zidar (2020) also provide evidence on the employment effects of firm-specific local tax incentives. Criscuolo et al. (2019) and Cingano et al. (2022) provide valuable perspectives on firm subsidies in different national contexts, Britain and Italy, respectively. In both countries subsidies appear to have spurred employment, and interestingly the effects were stronger for smaller firms.

In the end, the success of industrial policy depends on a variety of contingent factors. Political capture cannot be ruled out—though in truth the same is true of practically any policy. It is difficult to generalize either on ex-ante theoretical grounds or as an empirical matter. As in most areas of government policy, the details matter greatly.

Conclusion

There has never been a shortage of the *practice* of industrial policy in the United States. What is different today is that the need for industrial policy is widely acknowledged by both sides of the political spectrum. Industrial policy has risen at the top of the national agenda self-consciously rather than being conducted surreptitiously. This provides an opportunity to reexamine its goals and principles.

When the inadequacy of good middle-class jobs is driven by secular trends such as technology and globalization, traditional social policy remedies are no longer adequate. Income supports and social insurance do not address the underlying malady. And preparing young workers for the labor market and reskilling older workers for newer occupations can only go so far when firms are not supplying an adequate quantity of good jobs for middle-skill workers. What is required are policies that intervene directly in the productive sphere of the economy with the goal of expanding the supply of such jobs. Good jobs require good firms.

Hence, creating good jobs requires interventions on both the supply and the demand sides of the labor market. On the one hand, workers must acquire the requisite skills to become productive on the job. This is the province of traditional workforce development and skills-training programs. On the other, firms and entrepreneurs must be provided with the right ecosystem to nurture their development and expansion so they can generate quality employment.

A fundamental weakness of prevailing local economic development practices is that programs to retain and attract firms operate at some distance from—and often in tension with—workforce training programs.²¹ As Tim Bartik has

emphasized, what is required is not just jobs, but bringing good jobs to those who would otherwise be unemployed or employed in less-productive positions.²² An explicit good-jobs focus, along with better coordination of these different streams of work, would ensure both that training practices are appropriate and that firms receiving public assistance create the right kind of jobs for those who need them the most.

The kind of programs I have advocated in this piece remain largely a sideshow in present discussions. The regional and good-jobs challenges in the American Rescue Plan lack ambition in scope and magnitude. The House and Senate versions of the more expansive industrial policy bills currently under consideration are heavily focused on manufacturing, supply-chain resilience, high-tech industries perceived to be critical to national security, and competition with China. The Biden Administration's industrial policy blueprint focuses mostly on accelerating the energy transition (Council of Economic Advisers [CEA] 2021). While the need to stimulate quality employment is mentioned frequently in all these initiatives, the maintained presumption is that promoting these other objectives will also result in the creation of adequate numbers of good jobs.

I have argued here that this outcome cannot be taken for granted. In the absence of programs targeted specifically on the supply of good jobs and on technologies that are friendly to workers, labor market problems will continue, with significant costs to the social and political fabric of the nation, even if the primary objectives of this newfound enthusiasm for industrial policy are attained.

Endnotes

1. In terms of the taxonomy of policies presented in Rodrik and Stantcheva (2021a), the policies covered in this policy proposal fall in the middle cell of the matrix.
2. Sometimes it may be easier to define a good job by what it is not: a bad job. See Kantor, Weise, and Ashford (2021) for an exposé on Amazon’s employment practices that subject workers to arbitrary dismissal, close monitoring that strips them of autonomy and agency, and being shortchanged on pay and benefits.
3. In *The Good Jobs Strategy*, Zeynep Ton (2014) advocates a range of employment policies such as higher wages and benefits that she argues could help employers as well as employees. The argument, encapsulated in her subtitle, is that smart companies can boost profits by investing in their employees. Though such opportunities clearly exist, it is not clear we can rely on firms’ own bottom-line incentives for high-road employment practices. For a review of the literature and a skeptical take, see Osterman (2018).
4. The government subsidy might need to be financed by raising taxes elsewhere in the economy, which will create its own inefficiencies (due to the deadweight loss of taxation). Because of these inefficiencies, it will not be optimal in general to fully internalize the externality: the desirable Pigovian subsidy will fall short of the gap between social and private benefits.
5. Austin, Glaeser, and Summers (2018) consider three sources of economic externalities from nonemployment: fiscal costs on the state through the tax-transfer system, costs imposed on the family, and spillovers that encourage nonemployment by others in the community. They reckon these costs range 0.21–0.36 times the wage of low-income workers. See also Bartik (2019) for a broad discussion of economic and social costs associated with employment losses.
6. See Owens, Rossi-Hansberg, and Sarte (2020) for an application to revitalizing the city of Detroit.
7. Hamilton (1791) claimed he knew how these practical difficulties could be overcome, but did not have the space to discuss them—the kind of license every author would love to afford himself: “The requisite precautions have been thought of; but to enter into the detail would swell this report, already voluminous, to a size too inconvenient. If the principle shall not be deemed inadmissible the means of avoiding an abuse of it will not be likely to present insurmountable obstacles.”
8. This discussion is based and draws on Rodrik and Sabel (2022).
9. Modern theories of R&D support do allow for asymmetric information, as in Akcigit, Hanley, and Stantcheva (2022). But the range of uncertainty that is allowed is quite limited and these frameworks preclude other methods of information revelation of the type considered below.
10. U.S. legislators have shown appetite for ARPA-style agencies. In March 2022, the Advanced Research Projects Agency for Health (ARPA-H) was set up at the National Institutes of Health to “improve the U.S. government’s ability to speed biomedical and health research” (National Institutes of Health, n.d.).
11. The rest of this section draws heavily on Rodrik and Stantcheva (2021b).
12. Acemoglu (2021) asks, “How do you distinguish an AI automation application from one that leads to new tasks and activities for humans? For government policy to redirect research, these guidelines need to be in place before the research is undertaken and technologies are adopted. This calls for a better measurement framework—a tall order, but not a hopeless task. Existing theoretical and empirical work on the effects of automation and new tasks shows that they have very distinct effects on the labor share of value added (meaning how much of the value added created by a firm or industry goes to labor). Greater automation reduces the labor share, while new tasks increase it. Measuring the sum of the work-related consequences of new AI technologies via their impact on the labor share is therefore one promising avenue. Based on this measurement framework, policy can support technologies that tend to increase the labor share rather than those boosting profits at the expense of labor.”
13. Often the distinction is easy enough to make. When Elon Musk started to build a fully automated car factory for Tesla’s Model 3 in 2016, he was clear that his objective was to enable essentially worker-less production. Complete automation would allow the factory to operate beyond human speed: “Raw materials would go in one end and finished cars would roll out the other. In between, robots would do everything, a very high speed—speeds too dangerous to risk around frail human bodies” (DeBord 2017). Interestingly, Elon Musk’s plans failed and he had to improvise a new factory built around human workers. He conceded (on Twitter) that excessive automation was a mistake. By contrast, BMW and Mercedes have built their automation plans around human work, seeking both greater reliability and more customization in production. The McKinsey Global Institute (2018) reports, “[BMW] says that combining people with machines on its automotive assembly lines increases the flexibility to build multiple models in smaller batches and thus respond to shifting customer demands more quickly.” In new BMW and Mercedes-Benz factories, lightweight robots (called cobots) do not have to be physically separated from workers and other humans, and machines perform complementary tasks. Mercedes’s S-class sedans are built by workers who customize cars on the fly using hand-held tablets, with the automated work being performed by the lightweight robots (Wilson and Dougherty 2018).
14. Azoulay et al. (2018) argue that the ARPA model is particularly

suitable for public challenges with the following three features: a clear mission, an S-shaped technology curve (building on technologies that exist in nascent form but that would greatly benefit from further exploration), and significant frictions in the markets for ideas and technology. This seems to fit the ARPA-W suggested here.

15. As one long-term practitioner put it at a meeting at Harvard University, “We are at the center of everything, but control nothing.” High-level political support and buy-in from the local community are therefore important to ensure things can get done.
16. DARPA-type regimes were discussed above. Sectoral training programs, with their emphasis on dual-client (employees and employers) wraparound services, have also been extensively discussed in the labor literature.
17. The Build Back Better Regional Challenge and Good Jobs Challenge programs come closest to the spirit of the local industrial policies advocated here. The Regional Challenge is for “transformational investments to develop and strengthen regional industry clusters across the country, all while embracing equitable economic growth, creating good-paying jobs, and enhancing U.S. global competitiveness.” The Good Jobs Challenge promotes “collaborative skills training systems” and “aims to get Americans back to work by building and strengthening systems and partnerships that bring together employers who have hiring needs with other key entities to train workers with in-demand skills that lead to good-paying jobs. These two programs have been allocated \$1 billion and \$500 million, respectively, under the American Rescue Plan. These programs are described at US Economic Development Administration (2021).
18. Tax incentives are the predominant form of industrial and regional policy in the U.S. In the words of Slattery and Zidar

(2020): “In 2014, states spent between \$5 and \$216 per capita on incentives for firms in the form of firm-specific subsidies and general tax credits, which mostly target investment, job creation, and research and development. Collectively, these incentives amounted to nearly 40 percent of state corporate tax revenues for the typical state, but in some states, incentive spending exceeded corporate tax revenues. States with higher per capita incentives tend to have higher state corporate tax rates. Recipients of firm-specific incentives are usually large establishments in manufacturing, technology, and high-skilled service industries, and the average discretionary subsidy is \$160 million for 1,500 promised jobs.”

19. I am grateful to Gordon Hanson for the ideas in this paragraph.
20. The provisional loan commitment to Solyndra in March 2009 was marked by joint appearances by Secretary Steven Chu of the US Department of Energy, and Vice President Joseph Biden. And, as noted, President Obama himself showed up at the company’s headquarters in California in May 2010 to publicly celebrate Solyndra’s apparent success.
21. For example, local economic development agencies may prioritize creating jobs in high-tech or highly skill-intensive firms with little employment-generating capacity over creating jobs for graduates of workforce training programs.
22. Connecting people in disadvantaged communities with good jobs requires, beyond training, complementary investments in transportation, child care, and services that increase job retention. See Bartik (2022) for a broad discussion. Particularly interesting is the model of employer resource networks; that model provides success coaches to small- and medium-size enterprises to help employees keep their jobs, thus effectively linking the workers with the relevant services (Bartik 2022).

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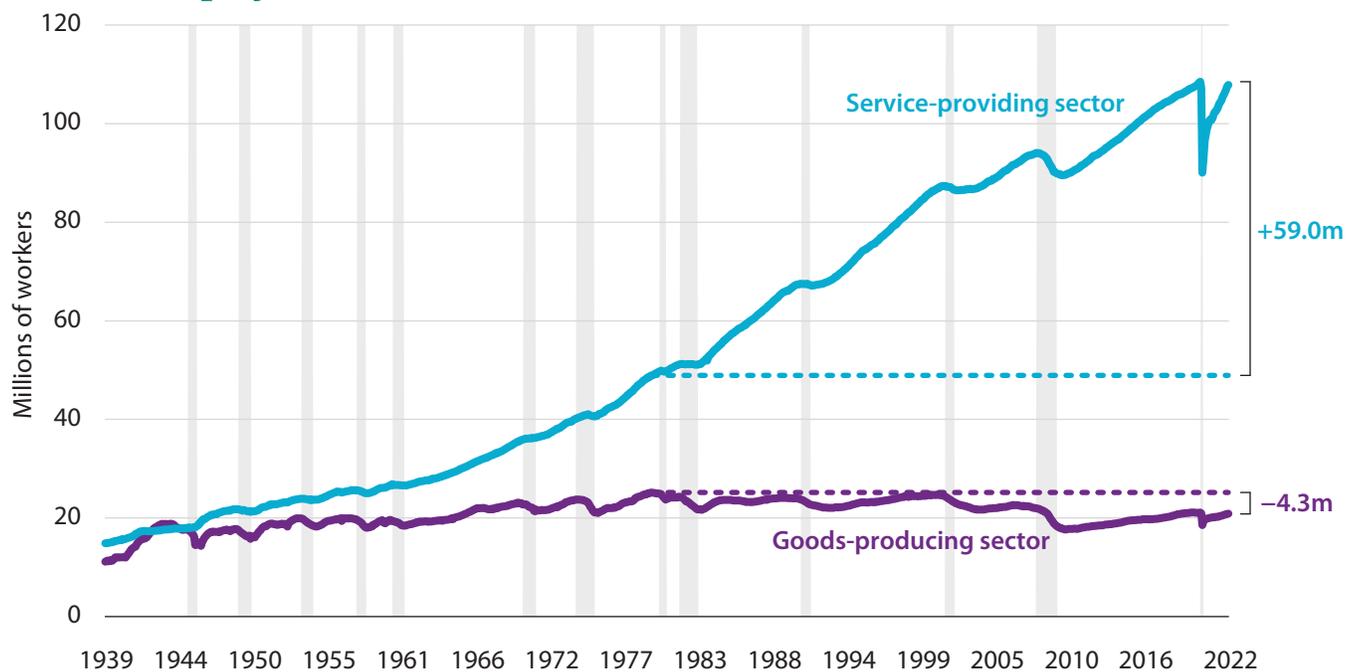
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Industrial policies have been with us for a long time, but often they have been carried out surreptitiously and without clear motivation. The recent revival of discussions around industrial policy provides a welcome opportunity for self-consciously crafting an improved set of policies. A modern approach to industrial policy must respond to new circumstances. It must target “good-jobs externalities,” in addition to the traditional learning, technological, and national security considerations. Relatedly, industrial policy’s traditional focus on manufacturing and globally competitive industries has to be broadened to service sectors and smaller and medium-sized firms. And the practice of industrial policy will need to rely less on traditional top-down policy instruments—such as subsidies and tax incentives for firms—and more on collaborative, iterative interaction whereby public agencies supply a portfolio of customized public services in exchange for firms undertaking soft commitments on the quantity and quality of employment. With these objectives in mind, this paper develops two types of specific initiatives: one at the local level and the other at the federal level. The local approach builds on existing development and business assistance programs that take the form of collaborative partnerships between local development agencies, firms, and other stakeholders aiming to revitalize local communities and create good jobs. The federal initiative is an Advanced Research Projects Agency (ARPA) focused on the promotion of employment-friendly technologies: ARPA-W(orkers).

Private Employment in Goods and Services Sectors, 1939–2022



Source: Bureau of Labor Statistics 2022.

Note: Gray bars indicate recession periods.

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