



# RETOOLING FOR GROWTH

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*Building a 21st Century Economy  
in America's Older Industrial Areas*

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*Published in association with The American Assembly  
Columbia University*

BROOKINGS INSTITUTION PRESS  
*Washington, D.C.*

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## *Manufacturing, Regional Prosperity, and Public Policy*

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U.S. manufacturing employment declined 20 percent over the decade from 1998 to September 2007. Having peaked near 20 million in 1979, the number of manufacturing jobs has dropped to 14 million, its lowest level since the early 1950s, and as a share of national employment to barely 10 percent.<sup>1</sup> About 40 percent of this recent job loss was visited on the traditional northeastern and north-central “industrial heartland”—Illinois, Indiana, Michigan, Ohio, Wisconsin, and the western parts of Pennsylvania and New York—which contains most of the “older industrial areas” that are the topic of this Assembly.<sup>2</sup>

The broad relevance of manufacturing to these areas is obvious. Its dominance is what made them “industrial” in the first place. Its decline is what now makes them weak. Parts of its legacy—brownfields and blight, older non-college-educated workers with health care and pension claims—now burden their movement forward. What is less obvious is manufacturing’s relevance to their future, or that of the United States generally, much less what can or should be done about it. That is the topic of this chapter.

A dominant view is that declining manufacturing employment is explained by causes either natural or positive: a long-term shift in consumer demand away from manufactured goods toward services, and a massive recent increase in manufacturing productivity.<sup>3</sup> An allied view is that although most “routine” American

manufacturing jobs will soon be lost to lower-cost foreign competition, the harm to the U.S. economy is small or even negative. American consumers gain low-cost foreign goods; U.S. firms and their workers can, by innovating new products, still capture value in profits and the design and marketing (if not fabrication) of them.

Many, of course, hold a less sanguine view. The U.S. labor movement (now representing only 7 percent of private sector workers, but those still disproportionately manufacturing based) has for years called for some measure of trade protection. Others, recognizing the consequences of manufacturing-job loss on older cities and the minorities and non-college-educated within them, express hope for a partial revival there of "advanced manufacturing," but without indicating how that might proceed.<sup>4</sup> Still others frankly wish that all of manufacturing would simply go away, leaving an America fully occupied by college-educated workers with little to no connection to making physical things. They regard manufacturing's latest gasps as progress in its creative destruction, which will clear the way to realizing a fully postindustrial society.

Uncontested in this welter of diagnosis, reaction, and prescription is the fact that the United States currently has no national strategy on manufacturing. This nonevent is virtually unique among nations, most of which are far more attentive to the state of their manufacturing base. That they are may reflect their noticing that no successful large nation has ever survived without some self-sufficiency in physical goods, or that foreign policy autonomy is nearly impossible without such. Or it may simply reflect their greater appreciation of the contribution that manufacturing makes to their present national economies, or its role in the innovation process necessary to future prosperity. Whatever the reason, we have little of that in the United States.

Here, instead, we hear a good deal about manufacturing's decline and impending death, but very little about what might make it important and worthy of attention. Even today, however, manufacturing accounts for nearly two-thirds (64 percent) of U.S. exports, as well as almost 80 percent of imports. Even though increased exports of services and decreased imports of oil are certainly part of the solution, it is very difficult to see how the United States might balance its chronically negative current account without some significant improvement in our merchandise trade balance. Manufacturing has historically accounted for some two-thirds of private sector expenditures on R&D. In this way and many others, it is deeply implicated in the discovery and innovation process that fuels long-run productivity and national wealth.<sup>5</sup> Average annual compensation in manufacturing, even after a long period of stagnation, leads the private sector—in 2006, \$68,859 versus \$55,470 in all of the private sector. Its jobs are particularly

important for those unfashionably non-college-educated workers who happen to constitute 70-plus percent of our current workforce. Of particular interest to those concerned about economic development, manufacturing has an exceptionally high direct employment multiplier of nearly 2.4—meaning that the 14 million reported remaining manufacturing jobs hold up nearly 20 million others. And so on.<sup>6</sup>

Of importance to the argument that follows is the fact that we also hear almost nothing about differences within manufacturing—no effort is made to distinguish jobs as bad as the worst the service sector has to offer from jobs that involve some of the most skilled application of technology on earth. To introduce here the terms we shall use later in our discussion, no effort is made to distinguish *low-road* manufacturing—typically low-paying, unsafe, environmentally degrading, marked by little investment in training or new technology, competing on commodity production of essentially commodity products—from *high-road* manufacturing—typically "advanced" or "high-end" and certainly "modern" in its use of equipment, marked by relatively high investments in training and new technology, dedicated to continuous process improvement and product innovation, covering some portions of design as well as production, and compensating its workers much better.<sup>7</sup> This failure to make distinctions between different sorts of manufacturing firms breeds unnecessary confusion. More important, it increases the risk of losing, through public inattention, manufacturing jobs that should uncontroversially be worth saving. To put the matter directly: Why, given the at least arguably great importance of manufacturing in our national economy, and the presence of many good jobs within it, would we not want at least to keep those jobs, assuming they could be kept?

To ask this question and think it worth answering does not require blindness to manufacturing's long-term decline, both in absolute and share numbers, in this and other advanced industrial nations; nor does it imply valuing manufacturing activity over other ones (education, health care, even financial and other business services); nor certainty that manufacturing's past importance portends disaster upon its loss. It requires only a bit of common sense. Assume that we want an economy of shared prosperity, good jobs, and the competitive practices that sustain them. We want that in all conceivable sectors of the economy. Why not in manufacturing?

We pursue this question here. Our discussion goes as follows. In the first section, we criticize some of the conventional explanations of manufacturing's decline. In the second section, we identify that portion of it that we think is both worth saving and capable of being saved. In the third, we indicate the sorts of actions required

at both the regional and national levels to do that. A conclusion draws lessons from the manufacturing case for regional development policy generally.

### Manufacturing Reality

How concerned you are about manufacturing decline depends not just on what value you attach to manufacturing jobs but also how you explain their loss. One common and comforting view on recent job loss is that it is both explained and excused by a tremendous increase in the sector's productivity, coupled with indifferent growth in domestic demand. An allied view puts the United States in the context of the world economy. It holds that high-wage nations will inevitably have less, but could have much better, manufacturing than in the past. "Routine" manufacturing will be shed to low-wage nations, but if rich nations continue to innovate they can retain a large share of manufacturing value even as they lose a good deal of the work and jobs.

We find the first view mistaken, and the second misleading.

Regarding the first—the rising-productivity, sagging-demand story—it is true that aggregate productivity growth in manufacturing has outpaced that of non-farm business generally, by about 60 percent. But most of that overall growth in productivity is attributable to spectacular productivity growth in a critical but relatively small subsector of manufacturing, namely, computer and electronic product manufacturing (NAICS [North American Industry Classification System] code 334). Measured either on an output-per-hour or multifactor basis, overall manufacturing productivity increased about 50 percent from 1990 to 2004, for a crisp annual rate of growth of 4.4 percent. But NAICS 334, which accounts for under 9 percent of total manufacturing employment, posted gains roughly ten times as great (426 percent on an output-per-hour basis from 1990 to 2000 alone), and was responsible for about 80 percent of the total increase.<sup>8</sup> Productivity growth in the rest of the sector, accounting for more than 90 percent of its employment, was anemic at best, averaging only about 1 percent annually. So job loss couldn't be attributable to great productivity gains, since there simply was little where most of the jobs were.

Even this record may be overstated by the rise in manufacturing offshoring to low-wage countries. As Susan Houseman has recently pointed out, there are anomalies in how the value of inputs from such countries are imputed in final-shipped manufacturing product. At a given level of domestic demand, labor cost savings from offshoring are registered as a decline in inputs, and thus result in an overstatement of domestic output and productivity in meeting it.<sup>9</sup> NAICS 334; a

prominent site of offshoring, is a particularly potent possible site of this overstatement. A less fashionable sector, furniture production, is another. Imports there almost doubled from 2000 to 2006 (from \$17.2 billion to \$30.3 billion), almost all coming from China, and the domestic industry lost more than 20 percent of its jobs. But U.S. government figures show an actual increase in domestic production over the period and, given far fewer domestic workers in it, a substantial increase in productivity. *Business Week* recently estimated the existence of some \$66 billion in "phantom GDP" over the 2003-to-2006 period because of this overstated domestic output. Sixty-six billion dollars is a small share of an over \$13 trillion-dollar economy, but enough to explain 40 percent of imputed gains to manufacturing output over the period.<sup>10</sup>

Finally—less important to the manufacturing productivity numbers but also driving them down—employment in the manufacturing sector is being underestimated and productivity therefore further overestimated by manufacturing's growing use of (often part-time) contract personnel. Current conventions in government accounting assign these to the "employment services" sector, rather than the "manufacturing" sector in which they are working. How big is this phenomenon? The Employment Policies Institute estimates that the number of contract personnel in manufacturing rose from 34,000 in 1972 to 707,000 in 1997. Converted to full-time-equivalent employees, the increase is even more dramatic—from 25,500 to 625,100—because many contract personnel now work much longer hours. In 2004, the Congressional Budget Office estimated that between a bit under a quarter to a bit under a half of all claimed 2.2 million manufacturing employment losses from 1979 to 2000 were attributable to the expansion of such contract personnel. A more recent estimate has employment services (those supplying contract workers) adding 8.7 percent to manufacturing employment by direct-hired workers in 2004 (up nearly fourfold from the 2.3 percent they added in 1989).<sup>11</sup> That would reduce productivity estimates by an equivalent amount.

If productivity does not seem to explain manufacturing job loss, perhaps declining growth in demand for manufactured products does. There is, in fact, little evidence of this. Taking cyclical variations into account, U.S. demand for manufactures has remained stable, at about 15 percent of GDP, for the past half century: demand for manufactures grew right along with the rest of the economy. But the Federal Reserve's measure of industrial production shows value-added in manufacturing rising just 21.3 percent over the 1998–2005 period, or 2.8 percent a year, somewhat under the growth in GDP. In manufacturing durables, the increase was even more meager: just 10.8 percent over the period, or 1.3 percent annually, even though durables included the output of NAICS 334, just discussed.

In nondurables, the increase was a much healthier 35.9 percent. But if petroleum, coal, and chemicals (whose output growth was inflated by sharp price increases) are excluded, nondurables output grew a more modest 18.3 percent over the period, or just 2.1 percent annually. Excluding oil-coal-chemicals from both durables and nondurables gives a seven-year output rise of just 1.7 percent annually.<sup>12</sup> It might appear from these weak numbers that manufacturing job loss need not be explained by spectacular productivity gains. Combined with lackluster growth in demand, even very modest increases in productivity—albeit much larger than those we just computed—might suffice. And indeed, everything else equal, they might.

But in fact everything else was not equal. What changed most significantly was trade. Stepping back to get some perspective, we see that from the 1920s through the early 1970s the additive share of imports to and exports from the U.S. economy and the rest of the world was relatively slight, and stable, averaging around 10 percent of GDP. Since the mid-1970s, however, that has more than doubled and now averages about a quarter of GDP. While real GDP has more than doubled since 1978, imports—80 percent of which, again, are nonoil manufactured goods—have quintupled, rising 410 percent in real terms, from \$328 billion to \$2 trillion in 2006 (in chained 2000 dollars). The increases from 1978 to 1988 were concentrated in steel, automotive, and consumer electronics. Thereafter, and particularly since 1998, the increases have been more broad-based across sectors.<sup>13</sup> Our chronically negative merchandise trade balance shows that U.S.-based manufacturing has simply not nearly kept pace: by 2006, the U.S. merchandise trade balance was \$818 billion in the red. Some \$233 billion of that was in a massive deficit with China. But negative balances were registered nearly everywhere: with Europe (−\$142 billion), Latin America (−\$112 billion), Asia and Pacific (−\$409 billion), the Middle East (−\$36 billion), and even Africa (−\$62 billion).<sup>14</sup>

Thus it is not so much that domestic demand is not growing fast enough but that more and more of it is being met from abroad. From 1990 to 2000, the value of manufactured products consumed in the United States actually grew slightly as a share of GDP, from 17.8 to 18.5 percent. But whereas in 1990 domestic manufacturing value-added, at 16.3 percent of GDP, met 92 percent of that demand, by 2000, at 14.5 percent of GDP, it met only 78 percent. By 2006, U.S. demand for manufactures was down to 16.3 percent of GDP, but the share of that met by domestic supply, at 12.1 percent of GDP, was down further, to just 74 percent of the total.<sup>15</sup> The rest—1.5 percent of GDP in 1990, 4.0 percent in 2000, and more than 4.2 percent in 2006—was accounted for by net imports. Total U.S. manufacturing output over the period was flat, increasing less than 1 percent; manufactured imports over the period increased 25 percent. Whatever one thinks of

gains from trade, there is no way to explain manufacturing job loss without reference to it. We will return to this.

Moving to the second story—about retaining value, if not jobs—why do we find that misleading? For starters, there is no reason to think that the manufacturing jobs lost in the United States were merely, or even predominantly, the routine jobs that many are happy to see go to other nations. If in doubt, ask any unemployed auto worker. More generally, if “routine” manufacturing were being shed, we would expect substantial growth in the average wages for U.S. manufacturing workers, since the “routine”—low-paying—ones were eliminated. But that is not the case. From 1990 to 2005, the data show, real U.S. hourly wages grew only 5.9 percent, a dismal 0.38 percent annually. Even including benefits, the increase was only 14.9 percent, still less than 1 percent annually.<sup>16</sup>

Two recent studies of consumer electronics—of laptop computers and Apple’s iPod—still suggest the plausibility of the retained-value thesis. In both, the United States retains the largest share of income because, even though nearly all the manufacturing jobs are low wage and offshore, most of the profits go to U.S. firms such as Dell, HP, Apple, FedEx, and Best Buy.<sup>17</sup> Does this allay our doubts? Not really, since there are relatively few decently paid U.S. workers employed at these companies. Obviously, computer electronics are an extreme case, and obviously innovation for new products is, *ceteris paribus*, something the United States should strive for. But for that innovation to directly benefit workers in or around manufacturing, those workers will have to be seen as making some contribution of value. And in the cases given, they generally were not. We did a rough spreadsheet analysis, modeled on the studies cited, for automobiles purchased in the United States. In the auto case, unlike in the consumer electronics examples, the U.S. share of jobs and profits are about the same. This is obviously more favorable for U.S. workers. Yet autos are considered a near disaster, and laptops and iPods are American success stories, despite the untoward distributional consequences.

The deeper problem with this view, however, is what it says about the relationship of innovation to manufacturing, as currently mediated by U.S.-based multinationals. Precisely how much knowledge of making something is needed to know how to improve it is anyone’s guess, and almost certainly varies across industries and kinds of product. But we do know that thousands of studies of innovation suggest a pretty close connection between fabrication and invention, especially the multiple incremental innovations that eventually bring whole new worlds into view.<sup>18</sup> And we know that modern production is a famously complex process, typically involving networks of firms and diverse suppliers, with different sorts of spillovers in knowledge and innovation among them, that are hard to

build again from scratch once they are lost. We also know that most other countries think of themselves, far more self-consciously than the United States does, not just as stable producers at whatever point their "natural" industrial advantage (say, low labor costs) suggests. They aim to improve their position within that value system, and to reach the point where they, too, can make critical innovations, capture first-leader status, lock in monopoly positions, and otherwise be off to the wealth-generating races. That is why poorer countries such as China and India are investing so heavily in education, and bargaining access to their internal market for multinational promises to locate R&D and other knowledge-intensive activities in them. Certainly, and entirely properly, they have no intention of stopping at commodity assembly of laptops for American middle-schoolers. We also know that U.S. multinationals, whose offshored and then reimported products make up more than 40 percent of U.S. manufactured imports, have no particular interest in improving the position of U.S. workers, nor of the U.S. economy.<sup>19</sup> They are certainly not seeking national comparative advantage, but only a firm-based absolute advantage based on labor arbitrage, which has nothing to do with trade at all. Put these elements together, and it does not seem at all implausible to us that the U.S. domestic economy could eventually lose big chunks of innovative capacity as its lead firms become more and more remote from actual production processes—and that U.S. workers would naturally suffer those losses.

Of course, destroying parts of a country's domestic capacity and moving it offshore may not be good for its population, and is nowhere recommended in the articles of economic science, but it may benefit others. And no moral person would wish unnecessary poverty on anyone, including the roughly 40 percent of the world's population that survives on less than two dollars a day, some billions of whom happen to live in India and China. But the thought that a concern for the poor now motivates U.S. multinationals and banks is risible, and that globalization's effects have been overwhelmingly positive for them only slightly less so.<sup>20</sup> The first responsibility of any democratic government is to its citizens. Other countries manage, without war or rank protectionism, to build and defend comparative advantages that benefit their populations. There is no reason why the United States should not also do so.

To summarize, then, manufacturing in the United States did not shed jobs principally because of a spectacular sectorwide productivity advance in the face of stagnant domestic demand. In fact, the sector is a bit bigger, and a lot "fatter" (that is, less productive), than the conventional story suggests. Increased and almost uniformly negative net balances on trade explain the greater part of recent losses; and about half of this loss is due to U.S. firms themselves. To get a better story on

numbers of manufacturing jobs, the United States will have to get a much more accountable set of multinationals, a more competitive domestic manufacturing sector, or both. To get better-quality jobs—meaning jobs that pay better and are safer, less environmentally degrading, and ideally, more interesting to those who have them—the United States not only will have to do these things but also will have to aim deliberately at high-road manufacturing, which means also closing off low-road manufacturing that is stealing some of their business. That will almost surely mean many fewer manufacturing jobs, but ones that are, on average, better.

### *Making Distinctions*

Thus far we have considered variation within manufacturing—for example, the tremendous contribution to stated average manufacturing productivity increases made by NAICS Code 334, the manufacture of computers and electronic products—largely for critical purposes. We now look at variation for constructive ones, to guide the task of raising living standards.

The first and obvious point of variation is sectoral. Looked at through the lens of appropriate regional or even national economic development, the particular shape of this variation—the region's areas of sectoral specialization—is tremendously important. Indeed, we would first define an economic "region" by its common specializations, and a successful region as one that is deep enough in those specializations to be relatively self-sufficient (less needful of imports) in their supply.<sup>21</sup> Current contrary fashions notwithstanding, we take it as all but settled that some measure of specialization is needed for productivity growth and innovation, which are the bases of high wages and dynamic growth.<sup>22</sup> Specialization, of course, has risks, but then so do most useful things; consider fire. It is *neglected* specialization that typically carries the great risk. The iconic case of overspecialization in the United States is the industrial heartland that is so dependent on the auto industry; it effectively makes this point. What first drove its decline was not that it produced too many cars, but that other countries figured out how to build better ones.

Specializations also generally take time and cost to create. So for economic developers, the current range of specialization should effectively be taken as given. It follows that the starting point for almost any effort to increase regional wealth nearly always lies in or around existing specializations. The most promising place to look for adding wealth are specializations with high multipliers and a legacy of past success. Improving them, or combining them in new ways with others, or jumping off from them to something at least proximate, is almost always more rewarding than taking on the task of creating entirely new specializations.<sup>23</sup> This applies to regions specialized in manufacturing no less than others.

Looked at another way, however, through the lens of industry upgrading, the particular identity of sectors subject to such treatment is not important at all. What is important are firms. If broad and rising value-added per unit of labor and capital is what we're finally after, note first that interindustry variance in total factor productivity (output relative to the input of labor, capital, and energy) is much less than variance in value-added per full-time employee (VA/FTE) alone. But note, second, that variance in VA/FTE within sectors is enormous. Returning to the case of manufacturing, for example, at its center—within discrete industries such as electrical appliances; metal-forming; machined dies, molds, and prototypes; and plastics processing—about a third of firms have VA/FTE of less than \$60,000; another third, up to \$90,000; and the upper third, a median that approaches \$120,000, including firms with a VA/FTE upward of \$300,000. As you go up the VA/FTE chain within particular subsectors, firms become recognizably more “modern” (using current technology), more “systematic” (applying consistent methods throughout their operations), and more “distinctive” (occupying valued market niches that they defend through continuous innovation).<sup>24</sup> They do things that are new, innovative, nonroutine, and difficult to perform, producing things that are valued well above their cost. They typically spend a great deal on training and new equipment. They generally export out of the region and often out of the country. We shall call such firms more or less *advanced*. By *high-road* we mean advanced firms that share the benefits of the premiums they can charge their customers with the typically better-trained, more involved workers who help produce that premium.

Manufacturing is dominated in its physical operation and employment by 300,000-plus smaller units of fewer than five hundred employees. They constitute the overwhelming share of plants—depending on how measured, between 85 and 99 percent—and about two-thirds of all manufacturing employment.<sup>25</sup> Within this large group as well as beyond, performance on VA/FTE is not, importantly, a function of plant size. There are firms or plants as small as twenty employees that are high-road, and there are firms or plants with five hundred or more employees that are distinctly low-road.

This means that there is widespread opportunity for manufacturing upgrading—here finally defined, simply, as moving firms up the VA/FTE ladder within their industry. We know that higher VA/FTE—not limited by size—is possible, since other firms have already achieved it. And although achieving a higher VA/FTE is not a cookbook exercise, industrial engineers and consultants know in most cases what individual firms need to do to achieve it. There are studies of the effectiveness of interventions made with these small firms, principally through the Manu-

facturing Extension Partnership (MEP) program of the National Institute of Standards and Technology, which has affiliates in every state. At quite reasonable costs, MEP specialists can achieve very significant—on average, 5 percent, but in some cases 20 to 50 percent—increases in small-firm productivity.<sup>26</sup> The reasons small firms do not typically do this on their own are familiar. They typically lack knowledge of best practice in their industry, and in particular the sorts of practices achieved by the best firms. And they lack incentive to change. Firms do not maximize productivity, but profit, and they can often maintain profits, or at least large salaries for their owner-managers, without the burdens of the changes in equipment, training, labor relations, and much else that are typically required to get on the high road. We will return to the incentive problem later, but the information problem, the MEP experience shows, is definitely soluble.

The vast range of performance across firms suggests not only the opportunities open to them but also a simple distinction between three sorts of manufacturing firms: first, the plants or firms with five hundred or more employees, either big suppliers to OEMs (original equipment manufacturers) or OEMs themselves. The second and third categories, accounting for about two-thirds of all manufacturing employment, include *bad smalls* and *good smalls*. Given their number, and the fact that they present the easiest opportunities for useful intervention and policy discrimination, we concentrate on them here, though throughout what is said of these two groups could be said of their bigger counterparts.

In their present state and inclination, bad smalls, accounting for nearly 50 percent of current manufacturing employment, deserve little policy attention. Their pay and productivity are too low. They tend to have weak regional multipliers, since they do little within-region purchasing. They are not an impressive source of value in their own operations, or through value they bring through export. And by capturing some of the more routine work that better firms could be doing, and typically need to do to amortize their higher investments in new equipment and training, they make the life of the good smalls, or those that want to be good, that much harder.<sup>27</sup>

Then there are those firms, the good smalls, that do deserve policy attention. They could be known immediately by exceptional VA/FTE, and especially also by exceptional wages. But these firms, though certainly worth attending to, definitionally need little help immediately. It is the firms that are just above average but trying to get to exceptional that are the sweet spot for policy. They might be recognized by high performance on some of the known industry practices causing high performance on desirable attributes mentioned earlier, such as modernity, systematicity, and distinctiveness; VA/FTE at least above average for their

sector; an average hourly wage about three times the present federal minimum; total compensation for hourly workers of at least half their value-added; health care insurance coverage for most (at least 80 percent) hourly workers, with an employer health care premium of at least \$3,000 per covered worker; widespread employee use of computers (more than 67 percent); and low employee turnover (less than 20 percent annually).

Recognizing the distinction between good and bad smalls is probably the single most important step in a policy response to our manufacturing problems. If we fail to make this distinction, a great deal of money could be wasted on firms that, absent wholesale protectionism, have no serious chance of survival, and whose success would do little good for anyone but their owners, beyond providing low-skill employment to those who have not found their way yet into other more promising sectors of the economy. Those workers should be helped, in ways suggested by other chapters in this volume, but not the firms that currently employ them.

#### *The Hard Case*

Another way into the tasks of upgrading is to consider limiting cases of competition. Despite the trade figures reported above, American manufacturing obviously competes effectively in international markets all the time. Manufacturing exports, while obviously lagging imports, have also grown spectacularly over the past twenty years. The obvious sometimes bears restating. The United States is still the world's leading manufacturing exporter, and its manufacturing sector still produces, to take a prominent point of comparison, something like two and half times the output of China. But as low-wage countries take a larger share of U.S. imports—either directly or through American multinationals operating there—the question is naturally asked: Isn't this hopeless? Don't other countries' labor-cost advantages make such competition impossible?

The short answer is no, at least not for the "good smalls" (and again, their corresponding "biggs"). Table 9-1, based on case studies culled by the authors from a variety of industries, including access to several proprietary firm studies by the management consulting firm McKinsey & Co., reports unit costs for landed goods from a hypothetical median U.S. and low-wage country (LWC) competitor. It makes a number of stylized assumptions about the cost structures these competitors face. Among these assumptions: that LWC shop-floor wages are only about a tenth of U.S. ones, but productivity is only about a quarter; that purchased services are about two-thirds the cost of U.S. purchased services; that the LWC waste rate (scrap, rework, rejects) is five times the U.S. one, but that material and energy costs are almost as high as U.S. costs; and that the LWC must add 12 percent to its costs

Table 9-1. *Comparison of Costs for Stylized \$10 Million Manufacturer, United States and Low-Wage Offshore Country, 2006*  
U.S. dollar, except as indicated

Type of cost	United States	Low-wage country
Manufacturing costs	7,500,000	5,782,793
Nonmanufacturing costs	1,000,000	717,563
Inventory interest expense	49,498	76,330
Receivables interest expense	61,250	61,250
Own-country cost	8,610,748	6,637,936
Duty and freight	...	531,035
Logistics and oversight	...	166,379
Cost of time on the water	...	27,658
Landed cost per \$10M sales	8,610,748	7,363,008
Landed cost index	116.95	100.00

Source: Daniel Luria, "Is Manufacturing in the US Toast?" *ManufactLINE*, September 2007, pp. 10–12.

to cover freight, duty, and logistics and asks what the landed difference is in unit costs. The net is that unit costs of the median U.S. firm are only about 17 percent higher than the landed cost of the median LWC competitor. As might be expected, the gap results almost entirely from the much lower wages and fringe benefits of workers in LWC firms. Although half of that gap is offset by the LWC's lower median productivity, and some more of it is reduced by the cost of servicing the U.S. market from offshore (freight, duty, cost of capital for time on the water), a substantial price difference remains.

Now consider what U.S. firms could do about this. Table 9-2 presents their typical options, weighting the effect of 10 percent improvements in different areas by the contribution of the area to firm cost. So, for example, firms could reduce waste further, but since waste is now only about 2.5 percent of costs, that would reduce product costs by only 0.25 percent. More substantial gains can be had by cutting material costs, typically by designing material content out of the product. Lighter products are valued by customers because of their own transportation and handling costs, and this area presents a more promising potential for gain on the order of 4.3 percentage points. Equivalent gains could be had by cutting labor costs, but we exclude that as undesirable. So that leaves increasing productivity and materials savings or, covering the aggregate, devaluing the dollar.

Firms obviously cannot control the dollar's value, but many have already pressed hard on the major levers—in materials and productivity—that are available to them. That they have done so is shown by the fact that, depending on

Table 9-2. *Payoff to Improvement Initiatives*  
Unit as indicated

<i>Improvement initiative</i>	<i>Impact of initiative</i>	<i>Landed cost, percentage of low- wage-country median</i>	<i>Reduction in gap</i>
Memo: baseline median		116.95	
Reduce waste 10 percent	Cuts labor, material, and capital cost of scrap, rework, and rejects	116.70	0.25
Reduce material cost 10 percent	Cuts material and weight	112.63	4.32
Reduce pay 10 percent	Reduces labor cost, but tends to increase employee turnover	113.12	3.83
Increase productivity 10 percent	Cuts overtime and employment unless firm grows	112.44	4.51
Devalue U.S. dollar 10 percent	Raises most offshore costs	106.54	10.41
Material + productivity		108.12	8.83
Material + productivity + U.S. dollar		97.71	19.24

Source: Daniel Luria, "Is Manufacturing in the US Toast?" *ManufactLINE*, September 2007, pp. 10–12.

industry, between 15 and 33 percent of U.S. firms already have lower costs than the offshore low-wage median, and the data show that almost all of those that do have higher labor productivity and more product design responsibility than the 67 to 85 percent in their industries that do not.<sup>28</sup> Not a great deal of effort would be needed to move these firms higher up the higher-value-added, lower-cost chain.

All of this said, U.S. manufacturers are competing with a moving target. An International Labour Organization (ILO) report suggests that, in China at least, productivity in the export-oriented portion of the manufacturing sector is growing at close to 7 percent annually.<sup>29</sup> Many U.S. manufacturers, therefore, will need not only to take a qualitative step forward in productivity but also to accelerate their ongoing year-over-year performance. This again, we think, recommends careful targeting of individual firms for assistance—something MEP does not currently do.

But the ILO report also recommends seeking maximum cross-firm efficiency in the supply of upgrading services and support. In addition to reserving these services for firms that either are or are close to being cost-competitive, the easiest efficiencies are achieved by shared supports: quasi- or full-fledged public goods, again in

information, but also in worker skills, physical goods such as mass transit or other infrastructure, and institutional supports in the form of higher standards, government purchasing conformed to those standards, and so forth. All of these productive public goods (some call them *productivity amenities*) share two features: they increase firms' efficiency without requiring large increases in private investment, and they raise the living standards associated with a given money wage. Typically, they are most efficiently supplied in cities.

This is potentially of great relevance to the topic of this assembly. In *Metro Futures: Economic Solutions for Cities and Their Suburbs*, we showed that sixteen metro areas had borne the entire brunt of the 1978–88 manufacturing decline.<sup>30</sup> Since then, those and other cities and metros have continued to lose manufacturing at a higher rate than the country as a whole, but the rest of the United States has been hemorrhaging factory jobs as well. Despite the continuing decline in urban manufacturing employment, there is some evidence that incomes in some of the largest cities may be improving as compared to those in nonurban areas. Nonmetro places, which did relatively well in the early 1980s as firms fled high-wage, unionized cities, have since then fared only a little better than metro areas in factory jobs, and they have fared much worse in earnings. Between 1979 and 2001, metro earnings per job rose \$7,500, or 23 percent, with half the increase occurring just between 1995 and 2000. During the same twenty-two-year period, nonmetro earnings rose just 1 percent.<sup>31</sup> As table 9-3 shows for the five heartland states mentioned earlier, the largest metropolitan areas all have seen pay increases larger than their states' averages, and larger than those in smaller metro areas.

Historically, metro areas have also enjoyed a significant productivity advantage over nonmetro areas, which helps explain this pay gap.<sup>32</sup> Urban productivity and pay advantages are probably rooted in the sheer scale of cities and in the richer mix of manufacturing-related activities in and around those cities' areas of specialization.<sup>33</sup> This may not bode well for smaller cities, a point we shall return to. In the meantime, however, for all the reasons that cities' density has always helped underwrite a more abundant supply of public goods, they would again be the natural target for the public goods useful in manufacturing.

### The Right Policies

What would it take to encourage high-road manufacturing in the United States? Essentially what it takes to build the high road anywhere: higher standards of firm performance, and help in meeting those, in ways that effectively ground capital—retain it in place.

Table 9-3. Comparison of Employment Profiles and Hourly Wages in Five Western Great Lakes States and Selected Metros, 1998 and 2006

Units as indicated

State or metro	Manufacturing jobs, 1998	Manufacturing jobs, 2006	Change in manufacturing jobs (percentage)	Manufacturing wage, 1998 (dollars)	Manufacturing wage, 2006 (dollars)	Metro percentage of state wage, 1998	Manufacturing wage, 2006 (dollars)	Metro percentage of state wage, 2006	Wage change (percentage)
Wisconsin	593,200	505,000	-14.9	14.02	16.54		16.54	108.9	18.0
Milwaukee	170,000	132,600	-22.0	14.99	18.02	106.9	18.02	108.9	20.2
Appleton-Oshkosh	60,000	48,400	-19.3	15.22	17.59	108.6	17.59	106.3	15.6
Michigan	969,700	630,900	-34.9	17.61	21.83		21.83		24.0
Detroit-Livonia-Dearborn	142,500	97,100	-31.9	19.63	25.32	111.5	25.32	116.0	29.0
Grand Rapids	91,700	73,500	-19.8	14.74	17.86	83.7	17.86	81.8	21.2
Ohio	1,030,700	788,100	-23.5	15.79	19.16		19.16		21.3
Cleveland-Elyria	198,800	147,600	-25.8	15.45	19.10	97.8	19.10	99.7	23.6
Cincinnati-Middletown	149,300	121,700	-18.5	15.20	19.58	96.3	19.58	102.2	28.8
Dayton-Springfield	81,900	56,500	-31.0	16.89	20.28	107.0	20.28	106.2	20.1
Indiana	688,200	565,900	-17.8	14.97	18.57		18.57		24.0
Indianapolis-Carmel	112,500	100,300	-10.8	15.60	20.82	104.2	20.82	112.1	33.5
Fort Wayne	46,600	38,000	-18.5	14.89	17.69	99.5	17.69	95.3	18.8
Illinois	896,600	680,900	-24.1	13.75	16.03		16.03		16.6
Chicago	544,400	390,200	-28.3	13.49	15.77	98.1	15.77	98.4	16.9
Rockford	46,200	33,300	-27.9	15.53	17.87	112.9	17.87	111.5	15.1

Source: Bureau of Labor Statistics (2007), <http://data.bls.gov/PDQ/outsidc.jsp?survey=sm> (2006) and <http://data.bls.gov/PDQ/outsidc.jsp?survey=sa> (1998).

One form that this might take for multinationals and trade has recently been proposed by the Horizon Project.<sup>34</sup> It would close the gap between their interests and those of the nation in favor of the latter. Trade deficits could be capped by Congress and enforced either through temporary tariffs or restricted import licensing. The inherent conflicts in the office of the U.S. Trade Representative, which is currently charged with both expanding trade and enforcing trade rules, would be relieved by separating such promotion and enforcement. All current incentives to offshoring would be eliminated, while new incentives would be built into the tax system encouraging high-value-adding domestic investment. World Trade Organization-enforceable labor and environmental rights would be built into all new agreements, and grandfathered into old ones. Of course, there are innumerable problems in actually achieving these results with any certainty or precision, and without the corruptions that have previously attended active trade regulation. In principle, however, the basic mechanisms (or closely allied ones) are straightforward enough, and the goals are clear: box in multinationals that want access to the U.S. market to invest heavily in it. Make the United States thereby more self-supplied. Move VA/FTE up in individual industries.

The Horizon Project posits coupling this constraining program with a more mainstream, "softer" one, centered on increasing human capital, improving physical infrastructure, expanding social insurance, promoting labor-industry partnerships, and more deliberately organizing efforts to promote innovation. This softer program is now widely embraced and is the centerpiece of groups such as the Hamilton Project, whose participants find directive constraints on multinational capital such as those recommended by the Horizon Program anathema.

Our own view is that both programs are welcome, with, again, the caveat that in the Horizon program, much rests on the execution of the details. We are, for example, entirely in favor of partitioning the Office of the U.S. Trade Representative and of abolishing all subsidies to offshoring. We are much more nervous about how import licenses would be allocated in an already preposterously business-dominated polity. And we are more interested in things the United States might do to encourage export-oriented economies such as China to grow their domestic markets.

And, such national and international ambitions aside, we are interested in what a regional approach to high-road manufacturing might look like.

#### *What Does a High-Road Region Look Like?*

High-roading firms seek to drive the value of their products well above their cost. They add as much value, and eliminate as much waste as possible, within their

sector and share the gains from doing so with workers. A high-road region does much the same, but here the productive unit is not the firm, but the democracy. We stipulate a high-road region to be one that similarly organizes itself to add value, reduce waste, and capture and more equitably share the benefits of doing both, largely through democratic organization. High-road regions seek to accommodate and satisfy capital's interest in profit-making while subordinating that to public interests in equity, sustainability, and democratic power. They do so by providing both resident firms and individuals a range of location-specific public goods, typically beyond the means and certainly the incentive of individual firms to provide, that enable firms abiding by public standards to succeed.

This infrastructure helps such firms directly—with, for example, wage or environmental standards that drive out their low-road competitors, modernization services to upgrade firms, joint marketing, effective transit systems, lowered energy costs, and R&D of all kinds. It also helps them indirectly by its aids to individuals and regional efficiency and equity. It expands opportunities for individual residents to add their own value (education institutions, training) and reduce their own waste (transit again, smart growth patterns to reduce unnecessary individual consumption, energy efficiency in housing). It helps organize regional assets toward the same aims (integrating often-scattered human-capital systems to increase movement through them, pooling regional savings for investment, aggregating other dispersed assets—such as individual energy efficiency—for trading in markets). And, more generally and familiarly, it permits individual residents to enjoy higher levels of shared consumption irrespective of individual income (public safety, education, health care, insurance of all kinds, a clean environment, culture, and so forth). This wrap of social protections and services, and even more traditional public goods, relieves high-road firms of obligations that, because able to, they might otherwise be forced to meet.

The bottom line is this: the abundant provision of these productive public goods in places attracts high-roading capital to those places by increasing its return. But as capital's strategies and local investment come to rely on their supply, the immobility of these goods also serves to *ground capital*. Thus the ability of places to bargain with capital is restored. Regions can demand more of capital—less pollution, higher wages, better labor relations, more investment in the community—than is now demanded by competitive markets, in exchange for the infrastructure that allows capital to meet those demands profitably under competitive conditions. With a nod to Don Corleone, high-road regions can make capital an offer it can't refuse, and should not want to. Such offers go on all the time in the real world, with productive regions exchanging their wealth-generative capacities to get more out of a grounded capital.

But note, finally, the effects in the unreal world sometimes imagined in economic theory or pop journalism and increasing feared by the vulnerable—in which capital is fully mobile and investment across places responds immediately to expected after-tax rates of profit. Under such conditions, the rate of profit is the same everywhere. No single place can lower it. But, equally, none can raise it. So in such a world, non-mobile local populations (among the chief victims of internationalization) get all the benefits of increased efficiency in the places they call home.

We earlier stated that a successful region is one that shares a set of common large-scale specializations, and is deep enough in those specializations to be relatively self-sufficient (less needful of imports) in them. Successful regions are naturally high-road in that they almost naturally add value and capture the benefits of doing so locally. Specialization and self-supply are the key to that. Specialization is needed for wealth generation. Depth in specializations, to the point of self-sufficiency in them, helps ensure regional value capture, while promoting agreement on public goods that will further improve area productivity and efficiency. Finally, success in that helps underwrite the more familiar, favorably redistributive but less immediately industry-tied public goods.

#### *What Should Regional Economic Development Do?*

Our prescription for regional development of high-road manufacturing follows, straightforwardly, from everything said thus far. Regions first need to understand the universe of firms they contain, starting but not ending with those in significant areas of specialization. What does the region do more of than other places, and at what scale? How well does it do it compared to other regions, the nation, and world benchmarks—what is its relative productivity? Where in the region is the specialization most concentrated? To whom and where does the specialization sell its output? From whom and where does it buy its inputs? In effect, regions need to map themselves.

We did the beginnings of such a map in the western Great Lakes region in our work on component manufacturing. It showed, not surprisingly, auto parts and machinery as large-scale specializations. Together they made up close to a quarter of all manufacturing output and employment, and an absolute majority of regional exports, and had large if declining regional multipliers. We also discovered that the region buys more and more auto parts and machinery inputs from outside the region and that a large proportion of these purchased imports were products with high electronic content. The products produced by the region's areas of specialization had greatly increased electronic content—for example, engines and automatic transmissions now had electronic controls—but area firms were importing much of that,

reducing the regions' level of self-supply.<sup>35</sup> That told us what specific areas the region should concentrate on attracting, what would buttress its existing strengths—and should tell policymakers the same. More generally, while retaining and even increasing its specialization, the region should enrich its mix within the specialization. In this case, that would mean incorporating better activities (more design and engineering), emerging processes (more composites and other lightweight materials), and stronger companies (for example, in the auto industry, more successful firms like Honda, Bosch, and Aisin, and fewer weak ones like Ford, Delphi, and Dana).

With the targets better known, all sorts of strategies can be pursued to reach them. Some of these are individual firm interventions, of the type made by Manufacturing Extension Partnership affiliate centers. Other public goods are improved logistics, energy use, transportation, and community college training that could help support the region's industries. These should, on our recipe, all be targeted efficiently, and that means toward dense areas, where they will also find a disproportionate share of high-road firms and would-be high-rollers. And then there is state purchasing, which should explicitly favor high-rolling firms, especially those that are purchasing supplies within the region. No support should be provided to low-rolling firms, and as little as possible should be given to those that are not in dense regions. Specialization, scale, self-supply, reconcentration, discrimination. It's not a pretty mantra, but it is the one worth repeating endlessly.

While the heavy lifting must occur in the regions, and especially in their cities, the federal government, too, has a major role to play in making this approach to regional upgrading work to plan. Restructuring will inevitably be business-led, but there is no reason it need be as pathologically business-dominated as it has been to date. Regional efforts to discriminate in favor of high-value activities and the firms that engage in them should be explicitly encouraged. That would be greatly aided by a progressive federalism that sets higher national floors on wage protection, national insurance, and other basic benefits and citizen privileges, but then lets states experiment freely above that level, including on labor rights; gives states the financial wherewithal to experiment (by removing unfunded federal mandates, constraining fiscal competition among states by harmonizing their tax systems, and adopting some measure of the "fiscal federalism" common to other federal polities); and then shares the results of those experiments.<sup>36</sup>

#### *Weak-Market Cities in a Weakened Region*

Admittedly, applying this recipe to weak-market cities will be difficult. We are all for making old cities safe and attractive to individuals who possess human capital, but we would not want to place bets on the speed of recovery this strategy will guar-

antee. And "eds and meds"—educational institutions and medical centers—will likely add little real value to older cities without genuine regional specializations. The quality of "eds and meds" jobs can surely be improved through unionization, higher wage standards, and more worker involvement in making decisions, but will not, except in the rarest of cases, add up to a dominant strategy. The same goes for jobs in the hospitality sector, arts, recreation, and the other amenities sought by the creative class. Markets are quite able to place those services near the spending power of affluent seniors or their children.

A better strategy for an older industrial region, we should think, would be to place fewer but larger bets by concentrating creative thinking on a relatively small number of midsize and larger cities.<sup>37</sup> There, the focus should be on building on proven specializations by deepening local supports for firms in both sourcing and skill supply. Within that focus, there should be active discrimination in favor of good and improving companies, subject to their cooperation in sourcing locally. A region's first priority must be on developing a much richer understanding of its economy. For the western Great Lakes region, we can already describe on a preliminary basis some promising measures to deepen regional specialization.

*Metropolitan manufacturing might.* Imagine several of the region's governors and big-city mayors launching an initiative to map the economies of their major metropolitan areas. Imagine, further, that having identified more or less noncompeting specialties of each, they lobbied for and won a pilot program among their MEP affiliates to pinpoint world-class performance in those specialties. Imagine, finally, that they put the region's best minds to work pulling many more local firms up to that level.

*Attraction of appropriate activity.* Imagine the aforementioned governors, armed with their economic maps, identifying holes in the region's self-supply. Imagine, further, a coordinated effort to focus business attraction efforts on plugging those gaps, including a multistate effort to train the attracted firms' workforces. Imagine, finally, that a key attraction inducement would be to connect the newcomers to the increasingly world-class local supply base. With many of the region's specialties involving engines and torque transfer products, it is not hard to enumerate the list of large companies whose presence and sourcing within the region would provide significant new markets to existing manufacturers.

*Sewers, cement, steel, and cities.* Regions will be spending billions—indeed, collectively, trillions—to renew their water and sewer infrastructures over the next two decades. In-region purchasing of the goods and services associated with this recapitalization could help make many regions richer and more self-supplying. Imagine the governors and mayors mapping sewer and water refurbishment as a

multistate regional project. Imagine them organizing the financing and purchasing on a regional basis, turning this critical, metro-focused need into something rivaling the 1930s WPA: steel from Gary and Cleveland, trenching equipment from Peoria, process controls from Milwaukee.

*Reducing energy imports.* Despite the United States' producing close to two-thirds of the fossil fuels it consumes, most regions are large net importers of petroleum products, natural gas, and coal. The five western Great Lakes states that we describe in this chapter collectively consume more than \$100 billion in out-of-region fossil fuels, exceeding even the expenditure on their burgeoning imports of components for cars, trucks, and machinery. The resulting leakage of income saps regional economies of purchasing power that could make their economies larger, and of tax revenues that could make them more livable. Sensible public subsidies for and encouragement of in-region supply of conservation and alternative energy investments make obvious sense. The overlaps among automotive, construction equipment, aerospace, and wind-turbine-component requirements have been widely, and rightly, noted.<sup>38</sup>

### Conclusion

Almost any region of reasonable size has organizable assets that, if properly managed, can lift it from chronic economic depression. The lessons to be drawn from manufacturing's decline, we think, have broad applicability to efforts in other sectors. Again, the problem is usually not specialization per se, but inattention to its management. In the case of manufacturing in the older industrial area that has concerned us, it was incompetent specialization within a nation unwilling to share basic social costs across generations, and long fixated on an outmoded economic ideology on trade. Smaller weak-market cities may be sacrificed to this. But the blame has much less to do with transitioning from a manufacturing-based to a knowledge-based economy than with the political failure to organize assets, to dynamically adjust the mix of manufacturing activities, products, and production recipes in anticipation of, and in reaction to, changes in those activities, products, and recipes in competitor regions around the globe.

Second, and in our view critical, regions should aim at self-supply and concentration. The latter is needed for efficiency in public goods, if nothing else. And they are needed for upgrading, and for their welfare effects in a time of relentless downward pressure on wages. And self-supply? Well, self-supply is needed for a quiet life, and a more democratic one. Enthusiasts of business-dominated globalization like to remind us that we need, every day and in every way, to be running

and figuring out new ways to outcompete others, whom we bombard with exports as they bombard us. A little more true comparative advantage (natural or acquired) governing trade among regions and nations, less but better trade, less forced integration and more local policy autonomy, less unbridled capitalism and more human development that was environmentally sustainable, would not be such a bad thing.

### Notes

1. Bureau of Labor Statistics, B-3, "Employees on Nonfarm Payrolls by Major Industry Sector and Selected Industry Detail, Seasonally Adjusted," September 2007, available at [www.bls.gov/pub/suppl/empsit.ceseeG3.txt](http://www.bls.gov/pub/suppl/empsit.ceseeG3.txt).
2. Howard Wial and Alec Friedhoff, *Bearing the Brunt: Manufacturing and Job Loss in the Great Lakes Region, 1995–2005* (Brookings Institution, Metropolitan Policy Program, 2006), offer the same share results, but for a slightly earlier period (1995–2005) and larger group of states (including all of Pennsylvania and New York).
3. See Congressional Budget Office, "What Accounts for the Decline in Manufacturing Employment," CBO Economic and Budget Issue Brief, February 18, 2004, available at [www.cbo.gov/ftpdocs/50xx/doc5078/02-18-ManufacturingEmployment.pdf](http://www.cbo.gov/ftpdocs/50xx/doc5078/02-18-ManufacturingEmployment.pdf).
4. Jennifer S. Vey, *Restoring Prosperity: The State Role in Revitalizing America's Older Industrial Cities* (Brookings Institution, Metropolitan Policy Program, 2007), points repeatedly to "advanced manufacturing" (see pp. 6, 8, 50) as a potential niche for distressed cities, but nowhere defines its attributes or provides guidance on how it might be developed.
5. For recommendations on an explicit innovation policy, see Robert Atkinson and Howard Wial, "Boosting Productivity, Innovation, and Growth through a National Innovation Foundation," draft paper from the Brookings Institution.
6. See Joel Popkin, "Securing America's Future: The Case for a Strong Manufacturing Base" (Washington: Joel Popkin & Co., June 2003) for R&D estimates and a useful review of manufacturing's national contribution and also for multiplier data. Multiplier data also from unpublished Bureau of Economic Analysis data, available for purchase at [www.bea.gov/regional/rims/order.cfm](http://www.bea.gov/regional/rims/order.cfm). Latest export and compensation figures, respectively, from TradeStats Express, available at <http://tse.export.com>, and Bureau of Economic Analysis, tables 6.2D and 6.5D, available at [www.bea.gov](http://www.bea.gov).
7. On the high-road versus low-road distinction, originally elaborated in the context of reviving metropolitan areas, see Daniel Luria and Joel Rogers, *Metro Futures: Economic Solutions for Cities and Their Suburbs* (Boston: Beacon Press, 1999). The terms are now common. For recent examples, see Joel Rogers, "Build the High Road Here," *The Nation*, April 17, 2006, pp. 25–26, and Thomas Kochan, "Taking the High Road," *MIT-Sloan Management Review* 47, no. 4 (Summer 2006): 16, 18–19.
8. NAICS and general manufacturing productivity numbers are taken from Susan Houseman, "Outsourcing, Offshoring, and Productivity Measurement in U.S. Manufacturing," Staff Working Paper No. 06-130 (Kalamazoo, Mich.: W. E. Upjohn Institute for Employment Research, April 2007).
9. *Ibid.*

10. Michael Mandel, "The Real Cost of Offshoring," *Business Week*, June 18, 2007.
11. Marcell Istávo and Saul Lach, *Measuring Temporary Labor Outsourcing in U.S. Manufacturing* (Washington, D.C.: Employment Policies Institute, November 2001); Congressional Budget Office, "What Accounts for the Decline in Manufacturing Employment," p. 4; Matthew Dey, Susan Houseman, and Anne Polivka, "Manufacturers' Outsourcing to Employment Services," Working Paper No. 07-132 (Kalamazoo, Mich.: W. E. Upjohn Institute Staff, December 2006).
12. All data from the Federal Reserve, [www.federalreserve.gov/releases/g17/g17tab1.txt](http://www.federalreserve.gov/releases/g17/g17tab1.txt).
13. See William Zeile, "U.S. Intrafirm Trade in Goods," *Survey of Current Business* (February 1997), pp. 23–38, and William Zeile, "Trade in Goods within Multinational Companies: Survey-Based Findings for the United States of America," November 2003, available at [www.bea.gov/papers/pdf/IFT\\_OECD\\_Zeile.pdf](http://www.bea.gov/papers/pdf/IFT_OECD_Zeile.pdf).
14. At TradeStats Express at <http://tse.export.gov>, exports, imports, and balances can be accessed as both maps and tables.
15. Data on manufacturing value-added from Bureau of Economic Analysis, [www.bea.gov/industry/xls/GDPbyInd\\_VA\\_NAICS\\_1998-2006.xls](http://www.bea.gov/industry/xls/GDPbyInd_VA_NAICS_1998-2006.xls); for imports and exports, see Bureau of Economic Analysis, "Exports, Imports, and Balance of Goods by Selected NAICS-Based Product Code," various years, at [www.bea.gov/newsreleases/international/trade](http://www.bea.gov/newsreleases/international/trade).
16. Bureau of Labor Statistics data show the employment cost index for manufacturing rising from 87.0 to 100.0 from December 1990 to December 2005; see [www.bls.gov/web/econst.pdf](http://www.bls.gov/web/econst.pdf).
17. On laptops, see James Fallows, "China Makes, the World Takes," *Atlantic Monthly*, July–August 2007; on the iPod, see Greg Linden and others, "Who Captures Value in a Global Innovation System: The Case of Apple's iPod," unpublished paper (University of California, Irvine, Merage School of Business, Personal Computing Industry Center, June 2007).
18. We do not attempt to summarize this vast literature here. See Popkin, "Securing America's Future"; Joseph Cortwright, *Making Sense of Clusters: Regional Competitiveness and Economic Development* (Brookings Institution, Metropolitan Policy Program, March 2006); and the many studies of innovation that have been done by those associated with the Sloan Foundation's Industry Studies Program, available at [www.sloan.org/programs/stndrd\\_industries.shtml](http://www.sloan.org/programs/stndrd_industries.shtml).
19. Raymond J. Mataloni, Jr. and Daniel R. Yorgason, "Operations of U.S. Multinational Companies: Preliminary Results from the 2004 Benchmark Survey," prepared for the Bureau of Economic Analysis, available at [www.bea.gov/bea/ARTICLES/2006/11November/1106\\_mncs.pdf](http://www.bea.gov/bea/ARTICLES/2006/11November/1106_mncs.pdf), p. 17.
20. See Mark Weisbrot, Dean Baker, and David Rosnick, *The Scorecard on Development: 25 Years of Diminished Progress* (Washington: Center for Economic and Policy Research, September 2005).
21. We agree strongly with Ann Markusen, "A Consumption Base Theory of Development: An Application to the Rural Cultural Economy," *Agricultural and Resource Economics Review* 36, no. 1 (March 2007), also at [www.hhh.umn.edu/img/assets/6158/app\\_rural\\_cultural\\_economy\\_aug06.pdf](http://www.hhh.umn.edu/img/assets/6158/app_rural_cultural_economy_aug06.pdf), that exporting is not the essential feature of successful regions. Any activity in which a region develops scale, performs efficiently, and is substantially self-supplying can power its own growth and income. We are in less agreement that these conditions apply in a nonurban setting.

22. Inter alia, see Vernon J. Henderson, "Externalities and Industrial Development," *Journal of Urban Economics*, no. 42 (1997): 449–79; Vernon J. Henderson, "Marshall's Scale Economics," *Journal of Urban Economics*, no. 53 (2003): 1–28.
23. Thus we agree with Cortright, "Making Sense of Clusters"; "The question about whether it is better, in the abstract, to be diverse or specialized, may actually be of limited policy relevance to states or cities. . . . [E]xisting specializations are a fait accompli, and the relevant policy question is what to do with them. . . . If one has a specialization, it probably is wise to do whatever one can to maximize its prospects for success" (p. 42).
24. We draw here on the findings of the Performance Benchmarking Service, an annual survey of small and medium-size manufacturing plants, drawing heavily but not exclusively from the upper Midwest, which now has detailed information on the performance of more than five thousand firms. See [www.performancebenchmarking.org](http://www.performancebenchmarking.org).
25. U.S. Department of Commerce, *Census of Manufactures: 2002* (Government Printing Office, 2004).
26. See Ronald S. Jarmin, "Evaluating the Impact of Manufacturing Extension on Productivity Growth," *Journal of Policy Analysis and Management* 18, no. 1 (1999): 99–119, and Eric Oldsman, *The Pennsylvania Industrial Resource Centers: Assessing the Record and Charting the Future*, unpublished (October 1999), available from [www.nexus-associates.com](http://www.nexus-associates.com).
27. Even institutionally sophisticated economists often believe, incorrectly, that low-road and high-road firms do not compete, that they serve distinct customer niches. But for reasons suggested in the text, in fact they do compete. The high-road firm, or high-road wannabe, needs a good deal of routine work to keep its expensive machines running a high proportion of the time. See Daniel Luria, "Why Markets Tolerate Mediocre Manufacturing," *Challenge* 39, no. 4 (July–August 1996): 11–16.
28. See Daniel Luria, "Is Manufacturing in the US Toast?" *ManufactLINE*, September 2007, pp. 10–12.
29. See International Labour Organization, International Labour Office, *Key Indicators of the Labour Market Programme*, 5th ed. (Geneva, September 2, 2007), available for download at <http://www.ilo.org/public/english/employment/strat/kiilm>.
30. See Luria and Rogers, *Metro Futures*.
31. See Economic Research Service, "Rural Industry: What Do Earnings Trends Tell Us about the Rural Economy?" (U.S. Department of Agriculture, December 15, 2003), available at [www.ers.usda.gov/Briefing/Industry/earningstrends](http://www.ers.usda.gov/Briefing/Industry/earningstrends).
32. Edith Wiarda and Daniel Luria, "Fixing What's Broke Where It Counts: Agglomeration in the Core Industrial Economy," *TechnEcon* 1, no. 2 (1989): 1–13, found a 20 percent productivity and wage advantage for metros in which there were at least 3,500 manufacturing workers and in which manufacturing made up at least 20 percent of economic activity. Globally, bets are being placed on manufacturing-intensive, specialized large cities.
33. Fallows, "China Makes, the World Takes," notes specialization by city in China—in memory cards, disk drives, and other particular laptop components. China is building cities at the rate of several "Manhattans" each year. Global demand has never been higher than it is today for cement, rebar rod, I-beams, elevators, commercial plumbing fixtures, cranes, and many types of equipment that are needed for the construction of cities.
34. Horizon Project, "Report and Recommendations," February 1, 2007, can be downloaded at [www.horizonproject.us](http://www.horizonproject.us). This work builds on Ralph E. Gomory and William J. Baumol, *Global Trade and Conflicting National Interest* (MIT Press, 2001), which argued that

higher-wage nations' ideal trading partners have wages of at least 25 percent of their own wages; made the basic point that nations, not just firms or their workers, can sometimes lose from trade; and specified the conditions under which trade moves from "win-win" to "win-lose."

35. For example, engines and automatic transmissions today are instructed by electronic controls. Although the western Great Lakes region has nearly maintained its long-standing share of engine and transmission manufacture, it has lost many of the associated controls components as mechanical and hydraulic controls have been replaced by microprocessor-based controls, which are being manufactured in high-wage facilities outside the region.
36. Richard Freeman and Joel Rogers, "The Promise of Progressive Federalism," in *Remaking America: Democracy and Public Policy in an Age of Inequality*, edited by Joe Soss, Jacob Hacker, and Suzanne Mettler (New York: Russell Sage Foundation, 2007).
37. Midsized cities are an interesting case, because they have often been the most specialized, but lacked the scale to merit a full support infrastructure. States and regions can help some of these weak-market cities. For example, the state of New York could direct heating, ventilation, and air conditioning (HVAC) contracts for super-energy-efficient New York City buildings to metro Syracuse to help maintain that city's longtime specialization in air conditioning (Carrier, Westinghouse). Syracuse, for its part, can get busy substituting New York-made components for components now made "offshore" (in Tennessee). The HVAC units will cost slightly more, but the New York and metro Syracuse economies will be larger and more effective, which will pay dividends that dwarf a modest price premium.
38. George Sterzinger, *Component Manufacturing: Wisconsin's Future in the Renewable Energy Industry* (Washington: Renewable Energy Policy Project, January 2006).