



Manufacturing a High-Wage Ohio

MARCH 12, 2018 – MICHAEL SHIELDS

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Ohio's growth as a state is inextricable from the growth of the manufacturing industries that built its communities. Manufacturing once made it among the nation's most prosperous states. Today Ohio remains third in the nation for the size of our manufacturing workforce: nearly 685,000 employees in 2016, trailing only the much larger states of California and Texas. However, over a period of decades, like in many other heartland states, the substantial decline in Ohio's manufacturing base has marked its economic downturn. Deindustrialization has left once-prosperous communities across the state poorer, weaker, and in some cases smaller. By 2016, Ohio had lost half its peak manufacturing jobs, and median household income trailed the nation's by \$5,300.¹ To recover its former prosperity and enable all its residents to thrive, Ohio must restore and build on the strength of its manufacturing base.

Fortunately, there are bright spots in Ohio's manufacturing landscape. Today, manufacturing continues to hold a substantial place in the state's workforce, employing 12.9 percent of Ohio workers, a share that is twice the national average.² Average wages of nearly \$59,000 per year in the sector exceeded the average for other sectors by \$11,000 in 2016. Ohio manufacturers contributed \$106 billion to the economy that year, representing 16.2 percent of the state's economic output.³ And Ohio manufacturing jobs have mounted a notable recovery since their lowest point in the

Recession. Since then, the sector is regaining some of its former vibrancy.

We must build on this manufacturing recovery through intentional policy making that recognizes the sector as a vital component of a robust and equitable twenty-first-century Ohio economy.

Today, policies that emphasize corporate tax credits and force communities to compete for firms are not working. To the contrary, they're costing the state vital resources that are needed to invest in communities and a reinvigorated manufacturing sector alike: first-rate schools, a twenty-first-century infrastructure, and an industrial commons as a hub of innovation, learning, and prosperity. Using public revenues to bet on corporate winners hampers the state's ability to invest in resources that benefit the whole sector and the broader economy. And if manufacturing policy is to help lift up the rest of the state, it must increase prosperity for the manufacturing workers who spend their wages in their communities.

Ohio needs policies that support these critical investments in the manufacturing community's future. The state must implement manufacturing policy initiatives that strengthen the sector and restore it as a vehicle to shared prosperity.

As a start, Ohio should, *make manufacturing more viable* by:

- + Creating an industrial commons of resources that manufacturers and workers can draw on to enhance capabilities
 - Establish an Ohio manufacturing task force to help firms identify opportunities to realize cost advantages of establishing or continuing operations in local clusters; this will help Ohio to retain or return jobs
 - Invest in manufacturing by supporting Manufacturing Extension Partnerships, America Makes, and other public-private partnerships
- + Increasing demand through procurement and policy
- + Investing in high-roads manufacturing by directing state pension investments to firms committed to good jobs and viable communities

Ohio should *support a strong workforce* by:

- + Building out industrial apprenticeships through public universities, community colleges, labor unions, and manufacturing partnerships
- + Averting layoffs using WIOA funding and the state's proven—but inactive model—with the United Labor agency
- + Providing adequate unemployment compensation to restore viability to the unemployment trust fund that workers need to regroup and retrain, through an adequate employer tax and a payroll tax

Ohio should *partner with workers* by:

- + Bolstering union organizing by setting aside so-called-right-to-work bills recently introduced by the legislature and by promoting organizing through procurement policy

+ Improving wages; a living minimum wage of \$15 per hour by 2025 would boost pay for about a quarter of the state's manufacturing workers

+ Including everyone by supporting efforts to extend opportunities to left-behind communities including people of color and young people

This report begins with an overview of the current state of Ohio's manufacturing sector, including both the highs and the lows. It then presents details of the trends that have been buffeting the sector across the state, as well as the profiles of the major manufacturing employers in the state. It concludes with a discussion of policy priorities that would help rebuild Ohio's manufacturing sector, and especially advanced manufacturing into an economic engine for the state, through robust infrastructure and targeted investments.

A Statewide Overview of Ohio's Manufacturing Sector

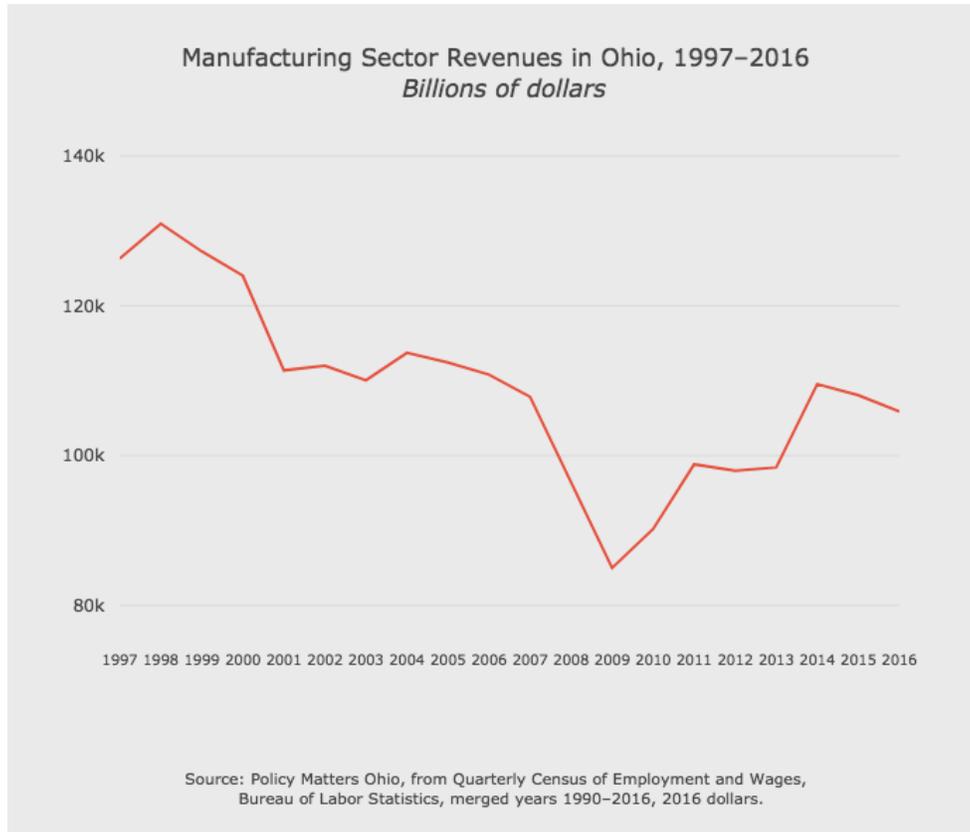
In Ohio, the manufacturing sector's corporate revenues of \$106 billion in 2016 were 16.2 percent below the sector's peak of \$131 billion in 1998.⁴ On a positive note, 2016 represented a substantial comeback for the sector from 2009, the worst year of the Great Recession. Current revenues are 24.5 percent higher than the \$85 billion earned in 2009.⁵

Despite this progress, as a share of the state economy, manufacturing is still at near-record lows: while manufacturing's 16.2 percent share of the state economy is up from 15.8 percent in 2009, it is still down substantially from its 24.6 percent share in 1997.⁶

Ohio Retains a Higher Share of Manufacturing Jobs than the Nation

Ohio remains at the core of America's industrial heartland. Ohio is the nation's third leading manufacturing state by number of jobs, trailing only the much more populous states of California and Texas. Despite dramatic job

FIGURE 1



losses, Ohio grew its share of the nation’s manufacturing workforce over the past quarter-century, as manufacturing jobs became more concentrated in the region. In 1990, Ohio had 38 percent more manufacturing jobs as a share of the workforce than the national average; by 2016, that figure was 49 percent.⁷ Measured by establishments, Ohio rose from 29 percent more than the national average to 49 percent.⁸

These figures show that other states are deindustrializing more rapidly than Ohio, creating nonmanufacturing jobs faster, or both. This reflects a regional trend: throughout the 2010–16 period, manufacturing became more concentrated in the Midwest and Industrial southeast, while growing more slowly in the rest of the country. There’s some evidence that this trend moderated in 2017.

A substantial share of the nation’s manufacturers and manufacturing workers continue to call Ohio home. Ohio is overrepresented in manufacturing firms in 15 of the 21 major

manufacturing subsectors, and 60 of 85 detailed industry sectors.⁹ In 62 of those, its share grew relative to the nation since 1990. Ohio manufacturing firms also tend to be larger than manufacturers across the nation.

Ohio has three times the national average of foundries, metalworks, forges, rubberworks, and steel products plants.¹⁰ Those shares have grown in all but steel plants. Ohio workers are at least three times more likely to be steelworkers, car parts manufacturers, paint and adhesive manufacturers, builders of metalworking machinery, or clay product makers than those in rest of the country.¹¹ Ohio exceeded the nation in manufacturing employment as a share of all jobs for 50 of 85 industry types, and that share grew for 47 since 1990.¹²

Manufacturing is not just an integral part of Ohio’s history: it is essential to a vibrant Ohio economy today. That means that addressing longer-term deindustrialization that has hampered the state for decades must be a key policy agenda.

Destination Ohio—But No Longer

Ohio was once among the nation's wealthiest states, attracting migrants from nearby rural Appalachia and African Americans from the South during the Great Migration. Black Clevelanders—once excluded from industry by discrimination—gained new opportunities to work in manufacturing during World War II, and the city's black population surged from 85,000 in 1940, to 251,000 in 1960, accounting for about 30 percent of the population.¹³ Nearby Akron tripled in size between 1910 and 1920 to 208,435 people: making it the fastest growing city in the nation. More than 75,000 Akronites worked in the rubber industry.¹⁴

Today, Ohio is still among the largest states: it's 11 million residents ranking it seventh in the nation. Yet, Ohio is no longer a destination—the state's growth rate has lagged the nations' by three quarters since the Great Recession.¹⁵ Ohio cities are actually shrinking.

This change in fate is deeply interconnected with the change in industrial density.

Ohio Economy Growing, but Workers No Longer Share in the Prosperity

Over the past generation, Ohio's economy has boomed, growing more than two thirds since 1979. Yet, Ohio does not feel like a booming economy for many of the people who live here. That's because ordinary Ohioans have been left out of the growth that their work made possible.

Wage growth in Ohio has been nearly flat for nearly four decades. Since 1979, the bottom 60 percent of workers have lost ground compared to their counterparts a generation ago.¹⁶

Deindustrialization is part of that story. Manufacturing jobs have fallen by 396,000 since 1990.¹⁷ The sector contracted from a substantial 22.7 percent of all jobs in 1990 to just 12.7 percent by 2016. When manufacturing is benchmarked to that 1990 share (of 22.7 percent), an even greater shortfall

of 521,000 manufacturing jobs is missing from our economy. Today, seven of the state's ten most common jobs are in occupations with an annual median wage less than 130 percent of the poverty level for a family of three, the threshold for public food assistance; in 2000, that figure was just four in ten.¹⁸ None of these top jobs is in manufacturing. Today, these jobs dwarf the jobs Ohio was once known for. Ohio has 495,000 production workers across all jobs: assemblers (84,520), machinists, (27,560), welders, cutters and solderers (17,280), and others. They are being overtaken by food prep workers (163,790), retail sales people (157,460), cashiers (117,390), laborers and freight handlers (111,230), waiters and waitresses (98,150), and registered nurses (128,030)—the latter being the only occupation in the group that pays more than the threshold for food assistance.¹⁹

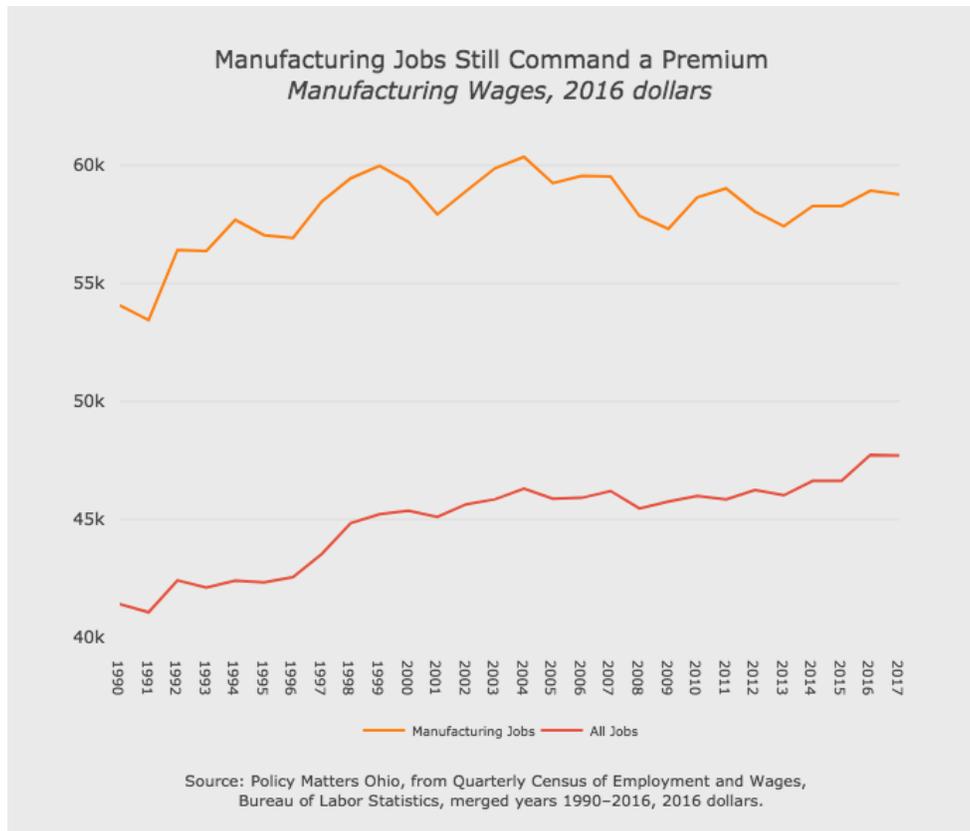
This restructuring of the economy has dampened Ohio's wage growth. Diminishing job quality within some manufacturing industries and sector-wide growth that is slower than the overall economy have also contributed to lackluster wages. Yet overall, manufacturing jobs still pay higher than average, and a strong manufacturing sector must be a vital component of a prosperous and inclusive job market for Ohio.

Manufacturing Wages Are Still Strong, but Slipping

Overall, with an average wage of just under \$59,000 across the sector, manufacturing remains a better paying career path than many other sectors in the state. Manufacturing earnings grew by \$4,700 since 1990 (adjusted for inflation), and remained \$11,000 higher than earnings for all sectors combined. Manufacturing jobs are especially vital to the 57 percent of Ohio workers who lack a college degree.²⁰ Those workers earn \$2.99 more per hour on average in the manufacturing sector.

However, the progress has not been consistent. Manufacturing earnings experienced much more fluctuation and grew at only about half the rate for all jobs. Over the twenty-seven-year span from 1990 to 2016, manufacturing wages have peaked five different times above today's level. While manufacturing remains a better paying sector,

FIGURE 2



factory wages have not kept pace with economic growth, and the manufacturing premium—the wage bump that manufacturing workers receive above other wage-earners—has shrunken.

Despite tepid growth, Ohio manufacturing jobs tend to pay better than elsewhere in the nation.²¹ That’s true across a majority of manufacturing industries, but especially so for advanced industries. Ohio enjoys a substantial share of high-paying manufacturing jobs in advanced, capital-intensive industries, especially in building transportation equipment such as car and aerospace parts, with a smaller portion of its workforce engaged in less-lucrative manufacturing jobs, such as wood products manufacturing and textiles. Greater union density also enhances job quality for Ohio manufacturing workers.

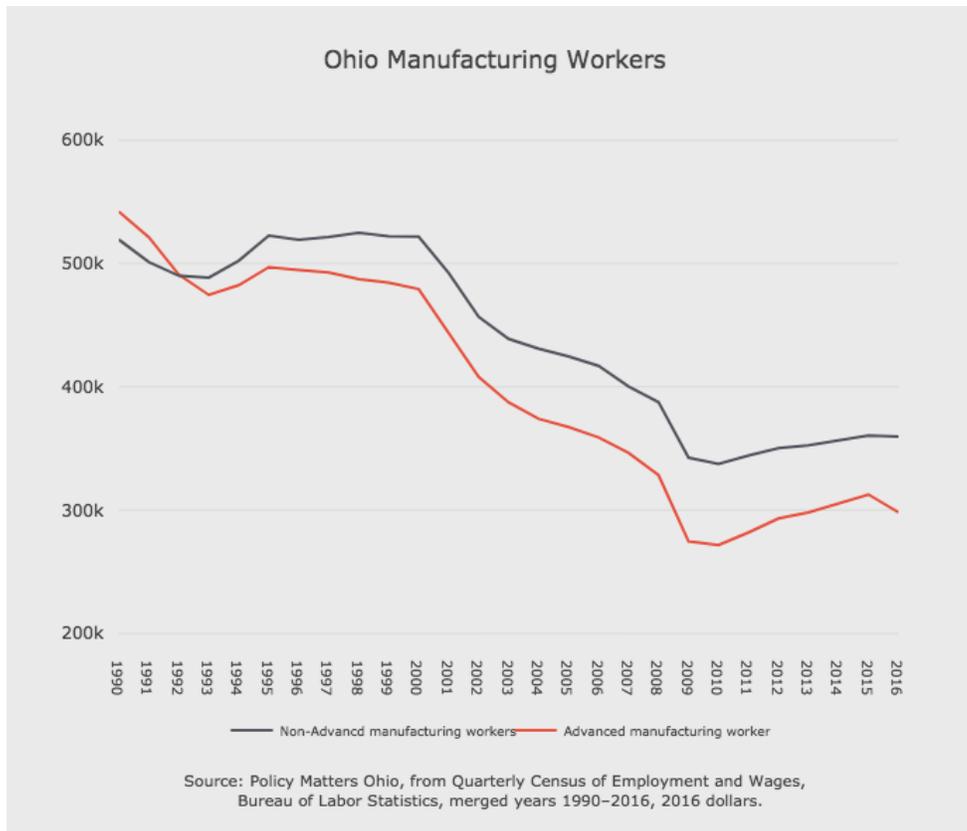
Union density is also a major factor in making manufacturing jobs better, on the average, than jobs in other sectors. Ohio manufacturing workers are 41 percent more likely to belong to a union than workers in other industries.²² Unions

and collective bargaining have been key drivers behind job quality victories for workers, from better wages to fair scheduling to workplace safety. However, the number of manufacturing workers represented by unions has decreased nationwide, from 15.8 percent in 2000 to just 10.0 percent by 2017.²³ This decline in union membership overlaps significantly with the slump in manufacturing wage growth in Ohio.

Ohio Specializes in Advanced Manufacturing

Nearly half of Ohio’s manufacturing jobs are in one of the thirty-five “advanced” manufacturing industries.²⁴ Advanced manufacturing industries tend to be capital-intensive and innovative. Examples include motor vehicle and aerospace manufacturing, pharmaceuticals, chemicals, steel mills, and advanced metals. Industries not considered advanced tend to use more raw materials as inputs, and they include agricultural products, textile and wood products, finished steel products, glass, and rubber. Cleveland’s Arcelor Mittal—a pioneer in advanced processes—is the

FIGURE 3



world’s most productive steel plant. It is worth noting that even non-advanced industries are increasingly using more advanced production processes, such as automation.

Advanced manufacturing jobs are better paying than other jobs in the manufacturing sector. In 2016, advanced manufacturing jobs paid an average salary of \$65,600 per year, \$11,800 more than the \$53,800 paid to other workers in the sector.²⁵ That advanced sector premium increased from 11.8 percent in 1990 to 18.0 percent today.

Unfortunately, advanced manufacturing jobs have fared worse than jobs not considered “advanced.” Advanced manufacturing industries lost 231,000 jobs (42.7 percent) since 1990.²⁶ Other manufacturing jobs fell by 160,000 (30.1 percent).²⁷ Car parts manufacturers, iron and steel mills, aerospace manufacturers, medical equipment makers, foundries, and automakers have all shed at least 16,000 jobs, and some as many as 28,000.²⁸

Advanced manufacturing industries hold enhanced potential to create good jobs that enable workers to support families, and communities to thrive. When workforce development advocates talk about skills gaps, these are the kind of jobs they have in mind. Yet, the trends in advanced manufacturing jobs spell trouble for Ohio.²⁹ Policymakers should be deeply concerned with the long-term viability of manufacturing jobs in general, but especially of advanced manufacturing jobs. These industries support more than their share of research and development, help Ohio compete on quality in global markets, and will serve as vital partners in solving some of the greatest challenges facing the state and the nation, from creating new cures to disease to averting climate chaos.

Production Workers Are Taking a Hit

Wages for production workers—those with hands-on involvement in the manufacturing process—fell 3.7 percent from 1999 to 2016 in Ohio, landing at \$16.80 per hour.^{30,31}

Among the 71 production worker occupations that existed in both 1999 and 2016, median wages fell in 50 of them in Ohio, employing 261,000 workers. That's 64 percent of all production workers in the state for whom data are available in both years.³²

To understand what is behind this developing trend—rising or stable wages across an industry, coupled with falling wages for specific categories of workers—it is necessary to look at how manufacturing supply chains have been restructured in recent years through the outsourcing of tasks to third-party suppliers.³³

Lead firms—powerful major businesses with strong name recognition that tend to sell their products to end use consumers—have structured their supply chains in this way in part to focus in on their “core competencies.” That specialization can create economic benefits, such as economies of scale.

But the practice creates new challenges for workers, the state economy, and even the long-term viability of firms themselves. One reason that powerful firms have begun outsourcing more of their supply chain is to capture a larger share of the total value contained in a finished product. They do this by aggressively pushing down the costs they pay for their inputs. Lower-tier suppliers compete amongst each other in fiercely competitive markets that squeeze prices for the components they build. Lead firms reap the benefit from those low prices—but their supplier companies get squeezed. That's one reason less of a product's value gets shared with workers. Workers in intermediary supplier firms often earn less, even for the same job.³⁴

There are some signs that this vertical disintegration is playing out in Ohio: the state's average establishment is now smaller by a fifth, shrinking from 46 workers to 37.³⁵

The reason these practices can ultimately hurt lead firms too is that fashioning supply chains in this way leads to underinvestment in capacity: including research, innovation, and human capital. That's because the supplier firms lack profit margins to make these kinds of investments, and

since lead firms share suppliers with their competitors, investments they could make to improve supplier capacity would benefit their competitors too. The structure leads to underinvestment that ultimately dampens growth across the sector.

A related trend has also taken shape within firms that likewise applies downward pressure on production workers' wages. The rise of temporary work within production jobs themselves has made manufacturing work less lucrative and less secure for many workers than working in the same job once was. Nationally, 23.5 percent of production workers are now employed by a temp agency, earning just \$27,600 per year on average.³⁶ Labor-leasing arrangements reduce job quality by reducing job security and creating a wedge between the labor cost the company pays and the wage the worker receives. The difference, siphoned off by the temp agency, is disproportionately paid by the worker. Firms also pay a fee to staff workers in this way, making it a potentially costly strategy that privileges short term planning over long-term sustainability. The rise of temporary hiring is driving down job quality in the manufacturing and other sectors. By 2016, Ohio had some 495,000 workers employed by temporary help agencies.³⁷

Place Matters— Manufacturing across Ohio

Deindustrialization in Ohio has been a story of deurbanization. It has hollowed out Ohio cities, shrunken them, and heaped a landscape of decaying homes and shuttered factories onto shrinking city budgets. Neither have rural communities been spared: in small towns, a large manufacturer can be the economic anchor for the whole community. If it closes down, its loss spikes jobless rates that can take years to recover. A person displaced from a well-paying factory job, whether urban or rural, may never reach the same earnings again.

The decades-long contraction of manufacturing jobs is playing out in the geographical dislocation of people from Ohio communities. When AFSCME surveyed its membership in Midwest communities in 2017, the union—

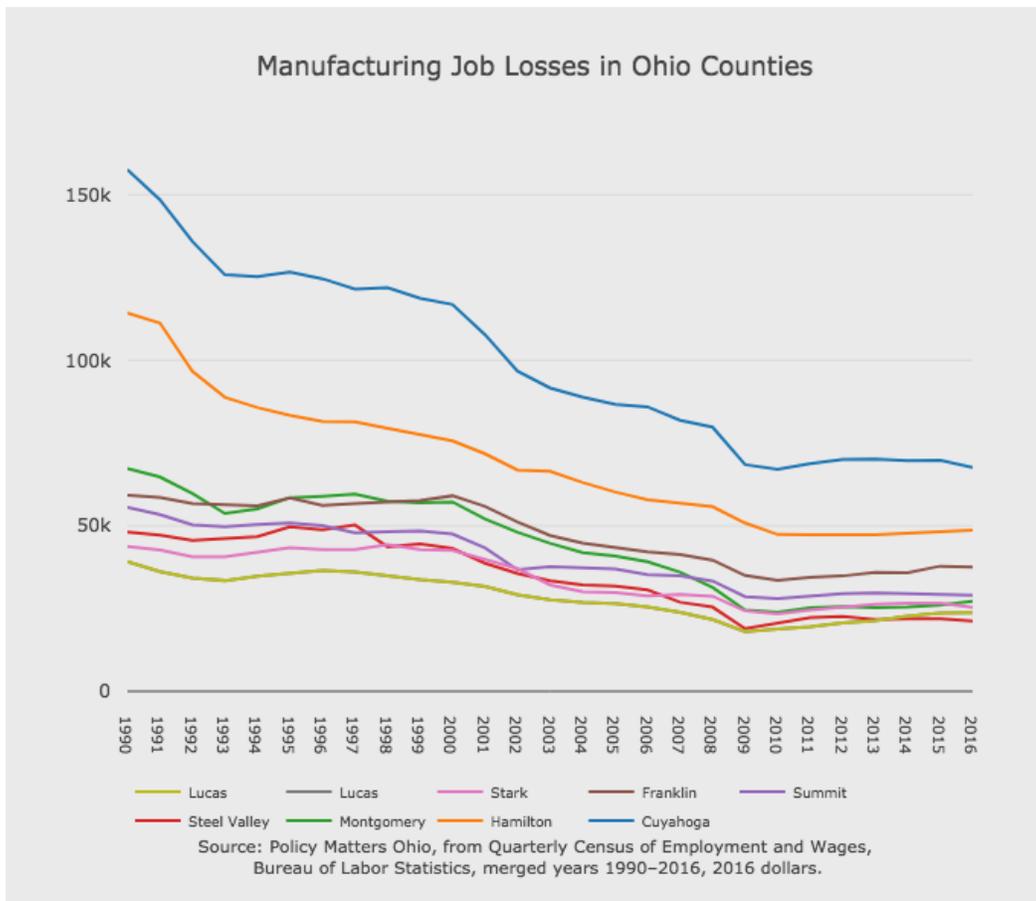
TABLE 1

Manufacturing Job Losses in Ohio Counties, 1990–2016

	Share lost	1990	2016	Net job losses	1990 Manuf share	2016 Manuf Share
Cuyahoga County	57.1%	157615	67645	-89970	20.2%	9.4%
Hamilton County	57.4%	114263	48690	-65573	21.3%	9.6%
Montgomery County	59.6%	67265	27194	-40071	21.5%	10.8%
Summit County	47.7%	55556	29063	-26493	24.0%	10.9%
Franklin County	36.6%	59297	37580	-21717	10.5%	5.1%
Trumbull County	62.5%	33217	12441	-20776	37.3%	18.0%
Stark County	41.9%	43731	25428	-18303	27.9%	16.1%
Lucas County	39.4%	39192	23762	-15430	18.0%	11.3%
Lorain County	40.0%	27245	16340	-10905	30.0%	16.8%
Clark County	51.5%	13881	6729	-7152	26.2%	14.0%
Mahoning County	41.1%	14877	8764	-6113	14.2%	9.0%
Allen County	40.3%	14805	8833	-5972	27.4%	17.5%
Muskingum County	66.6%	8817	2946	-5871	26.6%	8.8%

Source: Policy Matters Ohio from Quarterly Census of Employment and Wages, Bureau of Labor Statistics, merged years 1990-2016, 2016 dollars.

FIGURE 4



which represents public sector workers—learned that one of the most pressing worries its members had was that their children, facing too few job prospects, would move away, leaving them to face retirement alone.³⁸ In cities and especially small towns across Ohio, this is happening.

Depopulation of Ohio communities is driven by loss of lucrative job opportunities. Nowhere have more good job opportunities been lost to moderately skilled Ohioans than in the manufacturing sector.

Fourteen Ohio counties lost at least 5,000 manufacturing jobs between 1990 and 2016 (see Table 1).³⁹ The state's largest counties lost many times that. Three large counties lost more than half of their manufacturing jobs: Cuyahoga County (population 1.3 million), home of Cleveland, lost 90,000. Hamilton County, where Cincinnati is located, lost 66,000 manufacturing jobs. Dayton's Montgomery County lost 40,000, driven by automotive and parts maker lay-offs and closures. Summit County, where the tire and rubber industry once made Akron the nation's fastest growing city, shed another 26,000 manufacturing jobs (47.7 percent) after 1990, a decade after most of the city's tire and rubber factories had already been shuttered.⁴⁰

Deindustrialization Equals Deurbanization

Every major manufacturing city in Ohio lost population since 1990 (see Appendix), from Akron's 11.2 percent loss (25,000 people) to Youngstown's 31.9 percent (30,600).⁴¹ Cleveland lost 116,500 people, nearly a quarter of its population, while Cincinnati lost another 66,600 people. Among the state's major cities, only the capital of Columbus has grown in size, adding nearly 200,000 people for a population of now 837,000, driven largely by land annexation of the surrounding suburbs.

The depopulation of Ohio manufacturing cities took place while the state population overall grew by 7.0 percent, and the nation by 29.1 percent. Deindustrialization has left Ohio cities weaker, their residents poorer, and opportunity and political power more stratified and inequitable.

Restructuring is changing the geography of manufacturing in Ohio. Manufacturing jobs fell off sharply in each of the past three recessions. In many counties, they never recovered. Following the 2010 recession, most Ohio counties made some recovery. Rural counties tended to fare better than large urban ones. Putnam and Wyandot Counties have each added more than 40 percent to their 2010 manufacturing jobs total.⁴² Cleveland's Cuyahoga County regained just 0.8 percent of its lost manufacturing workforce, while Cincinnati's Hamilton County grew theirs by 2.8 percent.⁴³ The Ohio manufacturing sector is shifting to become more rural and suburban.

Cleveland Suffers the Most Losses

Cleveland and the surrounding area suffered the worst from deindustrialization, losing by far the greatest number of manufacturing jobs, and near the top in loss of manufacturing share of employment, as near-entire industries pulled the plug on their local operations. Cuyahoga County lost 12,200 car parts manufacturing workers (70.5 percent of total), 5,500 petroleum and coal products makers (96.2 percent), 5,000 aerospace manufacturing jobs (79.5 percent), and 4,800 foundry workers (82.8 percent).⁴⁴

Ever-Shrinking Youngstown

In many ways, the Steel Valley in and around Youngstown—situated in Mahoning and Trumbull Counties—is both the quintessential example of a once-flourishing manufacturing city, and ground zero for the devastation that has been visited on Midwestern communities in the wake of its loss. The Congress of Industrial Organizations was founded there in a Depression-era strike, before merging with the American Federation of Labor to form the AFL-CIO.

The Steel Valley is the site of the 1977 “Black Monday,” when the Youngstown Sheet and Tube company closed the doors on its Campbell Works and laid off 5,000 steelworkers. The bleeding hasn't stopped. Just since 1990, Trumbull County, the smaller partner in the steel-dominated Mahoning Valley, lost a staggering 62.5 percent of its manufacturing jobs, yet retained the second-highest manufacturing share

in the state. The effect of this deindustrialization on the city of Youngstown has been severe. Once the nation's fiftieth-largest city, Youngstown has been on a decades-long downward spiral since the 1930s, when more than 170,000 people called it home; today an estimated 65,200 people live in the city.

A city that once led the nation in home ownership, Youngstown now faces child poverty rates of 60.3 percent, nearly three times that of the state.⁴⁵ A history of segregationist housing policies and the out-migration of financially better-off white neighbors left Youngstown's African American community the poorest concentrated black population in the nation by the mid-1990s.⁴⁶ The out-flight of residents that followed the shuttering of steel mills collapsed the city's housing market and with it took the most substantial and secure source of wealth many families had.

Youngstown's trajectory has captured national attention. Today, Youngstown is home to America Makes,⁴⁷ a technology research institute established under President Obama to revitalize manufacturing in the region. A public-private member organization serving manufacturing companies, America Makes works to build capacity and a regional supplier network of manufacturers that build products through additive manufacturing techniques; think of 3D printing. The process reduces material waste and integrates automation technologies to speed up production processes and enhance productivity.

Rural Manufacturing Has Taken a Hit

Ohio's rural communities have not been spared from the state's deindustrialization. While today, a substantial 22 percent of rural workers in Ohio work in manufacturing, that share has fallen a quarter since 1990, when 29 percent of workers in rural Ohio communities were manufacturers. While nationwide, rural areas are typically known more for their agriculture and mining jobs, in Ohio, manufacturers comprise a major share of private sector employers in rural communities, which tend to have fewer professional and retail jobs and fewer big education and health care facilities.⁴⁸ In fact, across the heartland, smaller towns are

more reliant on manufacturing than are big cities.⁴⁹ This shift is becoming more pronounced as manufacturing firms exit cities.

Manufacturing jobs are also a source of good wages for rural communities. Rural workers in manufacturing jobs earn \$1.85 per hour more on average than their counterparts in other jobs.⁵⁰

Rural Ohio counties have lost some of the largest share of manufacturing jobs since 1990. Monroe county (population 14,600), an Appalachian county along the West Virginia border, lost a whopping 99.2 percent of its manufacturing workforce: a total of 2,600 workers, leaving the county with just 20 reported manufacturing jobs by 2016.⁵¹ The aluminum smelter Ormet Company—once the largest employer in Hannibal, staffing 1,100 workers at its peak—closed its doors in 2013.⁵² In 1990, 52 percent of Monroe County jobs were in manufacturing.⁵³ By September of last year, 7.0 percent of Monroe County's workers were unemployed.

Jefferson County (population 67,300), home of the city of Steubenville, lost three quarters of its manufacturing jobs, a total of 3,760 workers. Unemployment there was 6.3 percent in September 2017.

Muskingum County (population 86,300), where the county seat of Zanesville served a brief stint as Ohio's capitol in a bygone era,⁵⁴ lost two-thirds of its manufacturing workforce since 1990. Its 5,900 displaced manufacturing workers nearly matched the number lost in Youngstown's much larger Mahoning County, the major partner in Ohio's Steel Valley.⁵⁵

Ohio's Workforce Is Aging

Ohio's overall workforce and manufacturing workforce have both aged over the last three decades. The average worker's age has risen from 38 to 43 years, while the typical manufacturing worker went from age 41 to age 44.⁵⁶ Young people face fewer and less lucrative job options than their peers of a generation ago.

In the city of Cleveland, three of the top ten jobs in “aging industries”—those held by workers at least 45 years old and nearing retirement—are manufacturing jobs. They range in pay from \$29,200 for “unspecified” manufacturing, to \$50,400 for machinery manufacturing.

Employment agencies typically seek out aging industries as prospective career opportunities that could open for young people. Cuyahoga County’s labor-led workforce development agency—the United Labor Agency—has had notable success in its pioneering “demand-facing model,” which treats firms as customers seeking trained workers.⁵⁷

The challenge is that, while Cleveland’s manufacturing workforces ages, its manufacturing industries are contracting, so uptake of younger workers is reduced. None of the top jobs held by 18-to-29-year-olds are in the manufacturing sector; instead, younger workers are clustered in the lower-paid service sector, where limited hours dominate. Cleveland’s restaurant servers earn \$10,000 per year, for example, and its retail workers in clothing stores make only \$12,300.

These trends underscore the need to both improve the quality of all jobs, and to reinvest in manufacturing jobs to create opportunities for young people entering a labor market with fewer prospects than their parents had.

Deindustrialization Leaves Black Communities Behind

Manufacturing work traditionally has been an economic boon for black communities in Ohio. By 2016, the manufacturing wage premium for black workers was \$4.05, compared with a premium of \$2.07 for white workers.⁵⁸ That means that—due in part to their lower earnings in general—black workers typically get twice as large a wage bump for entering manufacturing jobs as white workers do. This fact underscores the linkage between a robust manufacturing economy and more equitable opportunity for workers marginalized by structural racism.

Despite black workers’ larger manufacturing boost, wage disparities persist: black manufacturing workers in Ohio earn an average of \$20.44 per hour, while white manufacturing workers earn an average of \$23.20.⁵⁹

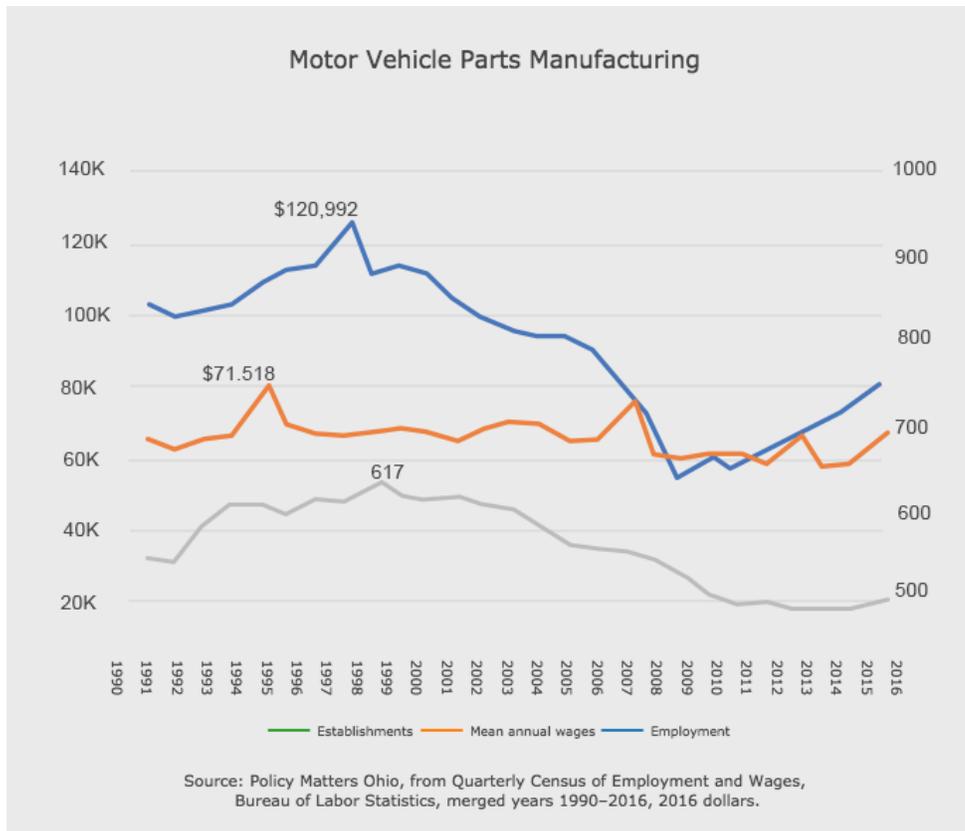
Across the workforce, the race wage gap is even larger, and it has doubled since 1979: from \$1.65 per hour to \$3.35 today.⁶⁰ Inequity exists in manufacturing jobs too, but is less severe. The sector-wide wage gap of \$2.76 leaves black workers with just 88 cents on the dollar compared with white workers, but that is a 7 point (36.8 percent) improvement over the larger workforce: where black workers earn 81 cents on the dollar. Greater union density in the sector certainly plays a role. The larger wage gap in the broader workforce reflects earnings gaps both within and across jobs. Black workers are both disproportionately represented in lower-wage jobs, and earning less when they work in the same job as white counterparts.

The deindustrialization of Ohio’s cities has been catastrophic for black workers and communities. By 2016, black workers in Ohio were 41 percent less likely to be in manufacturing than white workers.⁶¹

Black Ohioans shouldered more than their share of the fall-out from structural economic changes—exacerbated by bad policy choices—that have leveled communities across the state. While deindustrialization reduced manufacturing employment among white workers by 28.5 percent, for black workers that share was 46.0 percent.⁶² Suburbanization of remaining manufacturing, accelerated by economic development policies that targeted specific firms with tax incentives, moved manufacturing jobs out from urban cores and divided fates of Ohioans based on their race.

Manufacturing jobs are more equitable, and represent opportunity for marginalized people to be included in the prosperity of the state. If manufacturing revitalization efforts succeed in growing the sector and reaching minority communities, they could turn back the growing wage gap across Ohio.

FIGURE 5



The Struggles of Ohio’s Major Manufacturing Industries

While the loss of manufacturing jobs in Ohio has been accelerated by recessions, the sector has been in a devastating downward spiral for decades. This report analyzes trends since 1990 for technical reasons,⁶³ but Ohio’s struggle to maintain a strong and vibrant manufacturing sector has gone on much longer. Over the studied twenty-seven-year timeline, ten of Ohio’s nineteen major subsectors employed the highest number of workers back in 1990—the first year on our record.⁶⁴ Many of these industries were already losing workers by then, and since 1990, they have never recovered, even as the population, workforce, and overall number of jobs have grown.

Automobile Parts Manufacturing in Decline, but Still Reigns King

Automobile parts manufacturing remains Ohio’s single-largest manufacturing industry by labor force employed.

With some 75,000 workers in 2016, auto parts manufacturing exceeded the next two largest manufacturing job categories combined (plastics, with 43,500 workers, and printing supply products, with 21,600); but it had already peaked in 1997 at 121,000 jobs.⁶⁵ While the state has lost nearly four-in-ten jobs in the field since that peak, the bright spot is that auto parts manufacturing is on a recovery since its lowest dip in 2010. Ohio has added 20,500 parts manufacturing jobs since that point.⁶⁶

Unfortunately, auto parts manufacturing wages have not made a recovery. At \$58,300, auto parts makers still earn \$10,600 more than the average Ohioan, but this is down \$9,200 from the pre-recession earnings level in 2007, and down \$13,200 from the twenty-seven-year earnings peak in 1994 of \$71,500 (adjusted for inflation).⁶⁷

Parts manufacturers employ an average of 157 workers per establishment, but a mix of firm sizes means that many workplaces are much larger, with hundreds or even thousands of workers. When one of these larger establishments closes,

its departure reverberates in the community where it is based. Ohio has lost 139 auto parts manufacturing establishments since the peak of 617 in 1998, while the average workforce of a parts manufacturer has fallen 21 percent from its 1997 peak of 200. These concurrent trends indicate that this is not a case of smaller competitors entering the market, but rather large firms closing or shedding workers.

In 2005, two large auto parts manufacturers—GM’s supplier, Delphi, and Ford’s supplier, Visteon—filed for bankruptcy protection. While these suppliers historically had offered unionized wages and benefits that tracked those elsewhere in the industry, bankruptcy dramatically shrunk these companies’ employment footprints and decreased their wage premiums. The resulting supply chain in the auto industry is now lower paid.

Steel Mills Shuttered

Primary metals manufacturing was dominated by steel, and Ohio’s Steel Valley has been on a decades-long downward

spiral. Steel mills and steel product manufacturing once comprised nearly half of all primary metals employment in 1990, a total of 45,700 jobs.⁶⁸ Since then, Ohio has lost two-thirds of its steelworkers, a loss of 30,600 jobs.⁶⁹ Foundries, where workers cast molten metal into products using a mold, had comprised a third of primary metals jobs in 1990, but since have fallen by more than half, displacing 17,000 workers.⁷⁰

Few Industries Are Growing Long-term

In total, just 12 of Ohio’s 86 detailed industry sectors added jobs since 1990 (including three new jobs in “other leather manufacturing,” which could be a reporting discrepancy).⁷¹ Five of those growth spots were in some type of food processing, which has grown since 1990, but only by some 500 jobs. Accounting for growth in the employment-to-population ratio, even that number is behind the 1990 figure. When that benchmark is applied to the industries that lost jobs in real terms, the already substantial losses become staggering shortfalls.

TABLE 2

Peaks and Troughs in Manufacturing Employment, by Industry Type

	Peak	Peak year	Loss	Trough	Trough year	Gain	Net gain or loss since 1990
Transportation equipment manufacturing	194157	1990	-68833	96064	2009	29260	-68833
Fabricated metal product manufacturing	140490	2000	-42047	94078	2010	4365	-37362
Machinery manufacturing	118385	1990	-41474	66461	2010	10450	-41474
Food manufacturing	59887	1991	-69	53163	2006	6655	536
Plastics and rubber products manufacturing	91404	2000	-34659	49948	2009	6797	-13237
Chemical manufacturing	64610	1991	-20353	43138	2010	1119	-19721
Primary metal manufacturing	96963	1990	-60152	36811	2016	0	-60152
Electrical equipment and appliance mfg.	47270	1995	-19865	25503	2010	1902	-19405
Nonmetallic mineral product manufacturing	44971	1990	-17816	24525	2010	2630	-17816
Printing and related support activities	42417	1990	-20813	21233	2013	371	-20813
Miscellaneous manufacturing	42595	1990	-21254	20927	2010	414	-21254
Computer and electronic product manufacturing	45988	1990	-25578	19387	2014	1023	-25578
Paper manufacturing	35919	1990	-16077	18953	2013	889	-16077
Furniture and related product manufacturing	26368	2000	-10823	13737	2011	1808	-5765
Wood product manufacturing	22849	2000	-9861	10939	2011	2049	-3121
Beverage and tobacco product manufacturing	11463	1990	-3044	6553	2012	1866	-3044
Petroleum and coal products manufacturing	13152	1990	-8106	4311	2010	735	-8106
Textile and textile product mills, apparel manufacturing and leather products	22357	1990	-15330	7027	2016	0	-15330

Source: Policy Matters Ohio from Quarterly Census of Employment and Wages, Bureau of Labor Statistics, merged years 1990-2016, Location Quotients.

Among advanced industries, plastics and pharmaceuticals added 4,300 and 1,100 jobs, respectively.⁷²

Recovering Industries since 2010

Ohio has managed to bounce back somewhat from the worst effects of the Great Recession, adding 64,800 manufacturing jobs. The years from 2009 to 2011 marked the low point for 11 of the state's 18 major manufacturing subsectors ("three-digit industries").⁷³ Those industries show signs of recovery since then. However, some industries continued to fall: for primary metal manufacturing and leather and textiles, the latest year on record (2016) marks the lowest employment to date.

Zeroing in on detailed manufacturing industry sectors ("four-digit industries"), 51 of 86 have added a total of 79,600 jobs since 2010. Accounting for industries that continued to shed jobs, the state emerged with a net gain of about 61,900 jobs.⁷⁴

While the state has regained many manufacturing jobs, Ohio continued to shed manufacturing establishments in the recovery, losing 860 from 2010 to 2016.

Recommendations for Today

Ohio policymakers have yet to come up with solutions to the problems facing the state's manufacturing and broader labor market. Dramatic swings in the business cycle and rapid structural changes—exacerbated by policy—have displaced swaths of manufacturing workers. These workers do not wake up suddenly less skilled, less educated, or less experienced than they were the day before. These are the workers who built Ohio's economy—ignoring or writing off their productive capacity is a missed chance to invest in Ohio's future.

Ohio has taken the wrong steps in recent years. "Slash and hope" corporate income tax policies won't make the grade. Efforts to undermine the state's renewable energy portfolio have cut off growth in promising Great Lakes wind

power and the wind turbine supply chain in the state, and for Toledo's burgeoning photovoltaic cluster. Defunding proven layoff-aversion programs has made it harder for the state to retain its industrial base even as we lavish economic development incentives on firms we hope to attract.

We must build on our recent recovery through intentional policies that reposition Ohio as a forerunner of innovation and prosperity, and help support the creation of high-quality jobs. One proven way to do that is to invest in the development of an industrial commons, facilitated through public entities and public-private partnerships.⁷⁵ A winning strategy would also include a substantial build-out of Manufacturing Extension Partnerships (which currently are being slashed in the new federal budget), intentionality about job design that will effectively employ workers now training for advanced jobs, deep investments in research and development, access to capital, and intentional targeting of resources to specific regions and particularly impacted communities.

There is much that the federal government can do through trade policy to strengthen manufacturing nationwide. This section focuses on actions that should be taken in and by the state of Ohio to improve the health of this crucial part of our economy. It is not an exhaustive list, but a starting point for how the state could strengthen our manufacturing sector and reinvigorate it as a vehicle to broad prosperity.

As a start, Ohio should, *make manufacturing more viable* by:

- + Creating an industrial commons of resources that manufacturers and workers can draw on to enhance capabilities
 - Establish an Ohio manufacturing task force to help firms identify opportunities to realize cost advantages of establishing or continuing operations in local clusters; this will help Ohio to retain or return jobs
 - Invest in manufacturing by supporting Manufacturing Extension Partnerships, America Makes, and other public-private partnerships

- + Increasing demand through procurement and policy
- + Investing in high-roads manufacturing by directing state pension investments to firms committed to good jobs and viable communities

Ohio should *support a strong workforce* by:

- + Building out industrial apprenticeships through public universities, community colleges, labor unions, and manufacturing partnerships
- + Averting layoffs using WIOA funding and the state’s proven—but inactive model—with the United Labor agency
- + Providing adequate unemployment compensation to restore viability to the unemployment trust fund that workers need to regroup and retrain, through adequate an adequate employer tax and a payroll tax

Ohio should *partner with workers* by:

- + Bolstering union organizing by setting aside so-called-right-to-work bills recently introduced by the legislature and by promoting organizing through procurement policy
- + Improving wages; a living minimum wage of \$15 per hour by 2025 would boost pay for about a quarter of the state’s manufacturing workers
- + Including everyone by supporting efforts to extend opportunities to left-behind communities including people of color and young people

Rebuilding Ohio’s Industrial Commons

Today’s manufacturing supply chain underinvests in network resources. Where can manufacturers today look for new processes, services, or technologies? How can start-ups access financial services, or connect with purchasers of their products? How can workers train for manufacturing

jobs, and where can manufacturers in turn find trained workers? As smaller firms with tighter profit margins comprise a growing share of the industry, the challenge for any one firm of dedicating significant resources to research and development, commercialization, and product diffusion increases. And while profitable lead firms *could* invest in innovation in their supply chain, their tendency to use the same suppliers as their competitors means their investments would benefit competitors too. That incentivizes underinvestment that dampens productivity growth for the whole sector.

Today’s manufacturing sector needs a robust “industrial commons”—the set of shared resources that manufacturing firms and the workforce both can draw on to thrive in a changing economy. Ohio should increase its investments in resources that bolster this industrial commons. Several entities are already in place. Manufacturing Extension Partnerships (MEPs) connect small firms with engineers and research teams on a fee-for-service basis, train workers, and provide firms with access to capital infrastructure such as 3D printing and CNC machines. Ohio’s seven pioneering state-funded Edison Technology Centers have promoted process innovation and commercialization of new technologies. America Makes, Ohio’s Steel Valley area federally funded manufacturing innovation hub, conducts research and development on additive manufacturing and works to reestablish manufacturing’s role in the region’s economy. Investments in all of these should be deepened, building innovation clusters throughout the state, with a special focus on higher education institutions as incubators for advanced manufacturing.

Encourage Reshoring

Ohio should create state-supported teams with the financial expertise to help firms identify the cost advantages of returning production to domestic facilities, or of remaining in the state for firms that are still in Ohio. These teams could offer a total cost of ownership tool⁷⁶ like the one promoted by the Reshoring Initiative to give firms concrete data on the advantages of reshoring.

Increase Demand for Manufacturing through State Procurement and Other Policies

Ohio has an in-state purchasing preference for firms based in or producing goods in the state. The Department of Administrative Services and state agencies attach a 5 percent preference in contract bidding to Ohio products and services. The state should extend its procurement preferences to cover quality of work issues and to target reshoring. Ohio should bar doing business with any firms in recent violation of labor law. It should also extend special preference to firms bringing operations back to the state. Ohio manufacturing communities should utilize the newly created U.S. employment plan that now allows Department of Transportation funded projects to add points for domestic manufacturing and diverse hiring.⁷⁷

Ohio's 2008 clean energy standards created substantial demand for renewable energy technologies that can bolster manufacturing in the state, from wind turbines to solar photovoltaics in Toledo's glass-making industry. Under pressure by utilities, those standards have faced legislative threats since 2014. Ohio's legislature should affirm clean energy standards and re-extend them to entities that were permanently carved out.⁷⁸

The legislature should also establish a manufacturing task force of business, labor, education, and community groups to make further recommendations about key policy actions to bolster manufacturing. Policy efforts should prioritize development and retention of industries and firms that make deep investments in their communities and foster shared prosperity.

Increase Capital Investment in Good Manufacturing Jobs

Subsidy-based economic development that lacks intentionality about creating good jobs is not working. It turns markets on their heads and makes communities compete for firms with lavish tax giveaways that communities can ill afford. The cost falls on come from schools, infrastructure, and community resources.

Another, better way that Ohio could invest in manufacturing would be to direct state pension funds to invest in entities that grow jobs in Ohio communities. Heartland Capital Strategies provides a model. Heartland is a social investment entity that takes union pension funds and invests them in high-roads businesses, following United Nations Principles of Responsible Investment. Ohio should consider the same with its state pension fund. Investments should be directed to support the establishment and growth of firms that embrace responsibility to their workforce and community; directing investment in this way will yield double bottom line returns in the form of state economic growth and well-paying jobs.

Build Out Industrial Apprenticeships

Apprenticeships are making a comeback. In Northeast Ohio, WIRE-NET has created multi-employer industrial apprenticeships in several occupational categories. In addition, the Industrial Manufacturing Technician registered apprenticeship created by the Wisconsin Regional Training partnership and the AFL-CIO has been expanded to Ohio.⁷⁹

Ohio should increase state workforce development dollars and direct federal Workforce Innovation and Opportunity Act (WIOA) funding to target the expansion of apprenticeships. All future industrial apprenticeship efforts should have strong pre-apprenticeship programs and mandated community partnerships to ensure that diverse communities are prepared to enter into manufacturing careers. Apprenticeships are a key role that labor unions can play in strengthening the state's industrial capacity in ways that value and partner with the skilled workforce needed for advanced manufacturing jobs. The Building Trades provide a good model.

Pursue a Layoff Aversion Program

Pennsylvania's Strategic Early Warning Network (SEWN), layoff aversion program, has been found to save more than 1,000 jobs annually, at a reasonable cost of about \$1,000 per job.⁸⁰ The program saved Pennsylvania some \$40 million in

unemployment benefits alone over five years, not counting the add-on effects that come with stemming job losses.

Ohio should deepen capacity for lay-off aversion through a similar program. The state already has an effective model, but discontinued its partnership, with the United Labor Agency, in 2012. Layoff aversion and early warning mechanisms are mandates under WIOA, but Ohio retreated from its capacity when it failed to renew its expired contract with the ULA, a labor-led organization that had built 120 transition teams and trained 1,000 workers as peer supporters.⁸¹ Today, as WIOA faces the threat of possible cuts under the federal budget, Ohio's Congressional delegation should demand that full funding be extended.

Bolster Unemployment Compensation

Due to chronic underfunding, Ohio's unemployment insurance trust fund is projected to run dry by 2021, or sooner if the state experiences even a shallow recession.⁸² Rather than restoring the trust fund, legislators have responded by moving to hollow out benefits and slash both the share of unemployed workers who qualify, and the length of reciprocity, from 26 to 24 weeks. (A discarded proposal would have cut that to as few as 12 weeks.)

Both moves are short-sighted and irresponsible, particularly in a state marked by firm closures. Investments in the unemployment insurance trust fund are an investment in economic stability. In order for workers displaced from shrinking industries to retrain for new roles, we must ensure that they have the time to do so, and the resources to make the car payment and keep the lights on. Advanced manufacturing jobs are precisely the type of job that a worker can train for in the course of months, rather than the years needed to earn a degree. This is the type of career transition unemployment insurance is built for. And despite losses in the broader manufacturing sector, pockets of these middle-skill jobs are in demand as manufacturers seek to compete in a changing economy.⁸³

The state must restore long-term solvency to our unemployment compensation system by increasing the

employer tax, implementing an employee tax, and taking steps to reduce the need for support: never by turning its back on displaced workers once they do need it.

Embrace Workers as Partners

Public policies that strengthen workers' ability to participate in company decision-making clearly benefit workers, most prominently through higher wages and better benefits. But there is evidence that such policies could enhance manufacturing productivity, too.

It's no secret that unions help workers to take home more of the wealth they create at work, but just as vital is how unions give workers a voice in how business is done in their field. Higher union density tends to make work safer. It can also make production more efficient. When firms have choices about how they assimilate new technologies into their operations—using automation to either supplement workers on the shop floor, or to substitute for them and reduce employment or de-skill jobs—it turns out they frequently choose wrong. U.S. firms that have tended to use automation to displace workers in order to reduce labor bargaining power frequently have sacrificed productivity in the process.⁸⁴

Ohio legislators have recently proposed a raft of anti-worker, so-called "right to work" laws. Those legislative plans should be scrapped. Unions have been integral to long-establishing the manufacturing sector as a source of good jobs that pay family-sustaining wages. An Ohio worker in a labor union typically makes \$4 more per hour than a nonunion counterpart, some \$8,000 per year for full-time work. So-called right-to-work laws threaten the viability of the manufacturing sector as a source of good jobs that sustain the families and communities of those who work there.

Support Strong Wages

Unions help workers to keep more of what they earn, but not all workers belong to a union. To strengthen job quality, the state should pass a living minimum wage of \$15 per

hour, phased in by 2025. Policy Matters Ohio found that workers in the bottom quarter of the manufacturing sector earn about \$12.70 per hour—little more than the inflation-adjusted value of a \$15 minimum wage in 2025. Many would likely benefit from a minimum wage hike as employers seek to maintain pay scales. A minimum wage increase would especially benefit production workers employed by temporary help agencies.

Include Everyone in the Recovery

Young people and people of color are underrepresented in manufacturing. Efforts by employment agencies such as Towards Employment to include left behind communities should be supported with funding, tracking, and reporting of diversity efforts, and diversity requirements attached to state investments in the sector.

Conclusion

An economy that is changing due to increasingly rapid automation, digitization, connectedness, and globalism, must find a way to insulate communities from the shock of disruption, and to include everyone. The advances being made in these new technologies and processes create unprecedented opportunities for prosperity. And that prosperity is being realized: in 2016, Ohioans produced more overall wealth than any prior year on record. Yet, the very forces that make this success possible are also creating diverging fates: last year, the bottom three-fifths of Ohioans took home less pay than their counterparts did a generation ago.

This divergence is not inevitable. In the midst of economic rebound and growing prosperity, we have to revitalize our manufacturing sector in a way that not only creates wealth, but shares that wealth with the workers who make it possible, and enables communities to flourish. For Ohio, a vibrant manufacturing sector must be part of that future.

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Bernard L. Schwartz Rediscovering Government Initiative

RGI was founded in 2011 by Director Jeff Madrick to counter the anti-government ideology that has grown to dominate political discourse in the past three decades. TCF and RGI have launched the High-Wage America (HWA) project to research, define, and promote policies that can stimulate a productive economy and sustain jobs across the country.

Policy Matters Ohio

Policy Matters Ohio is a non-profit policy research institute that creates a more vibrant, equitable, sustainable and inclusive Ohio through research, strategic communications, coalition building and policy advocacy. www.policymattersohio.org

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Manufacturing a High-Wage Ohio Appendix

MARCH 12, 2018 – MICHAEL SHIELDS

Explanation of Codes

Industries are coded by the North American Industry Classification System (NAICS), which groups them by a numerical code that ranges from two to six digits. Two-digit codes describe major sectors: manufacturing is coded 31 through 33. Adding digits to the right groups industry subsets, and more digits means more specificity. Aircraft engine manufacturing is a six-digit code (336412), and an industry of some 14,800 workers. This report examines three-digit industries, then focuses on the four-digit codes that comprise larger numbers of Ohio workers than some of our “major” industries.

Ohio City Population Changes

	Population 1990	Population 2016	Population change	% change
United States	246,819,200	318,558,162	71,738,962	29.1%
Ohio	10,829,200	11,586,941	757,741	7.0%
Akron city, Ohio	223,535	198,508	(25,027)	-11.2%
Canton city, Ohio	84,126	72,163	(11,963)	-14.2%
Cincinnati city, Ohio	364,649	298,011	(66,638)	-18.3%
Cleveland city, Ohio	505,672	389,165	(116,507)	-23.0%
Columbus city, Ohio	638,446	837,038	198,592	31.1%
Dayton city, Ohio	182,129	141,143	(40,986)	-22.5%
Toledo city, Ohio	332,848	280,854	(51,994)	-15.6%
Youngstown city, Ohio	95,740	65,161	(30,579)	-31.9%

Source: U.S. Census Bureau, 1990 Census, and American Community Survey five-year, ending 2016.

Advanced Manufacturing Sectors

NAICS	Industry	Workers in 2016
3241	Petroleum and coal products manufacturing	5,046
3251	Basic chemical manufacturing	9,712
3252	Resin, rubber, and artificial fibers mfg.	5,567
3253	Agricultural chemical manufacturing	2,007
3254	Pharmaceutical and medicine manufacturing	4,846
3259	Other chemical product and preparation mfg.	4,970
3271	Clay product and refractory manufacturing	4,706
3279	Other nonmetallic mineral products	7,789
3311	Iron and steel mills and ferroalloy mfg.	7,747
3313	Alumina and aluminum production	3,280
3315	Foundries	12,653
3331	Ag., construction, and mining machinery mfg.	6,318
3332	Industrial machinery manufacturing	9,697
3333	Commercial and service industry machinery	3,685
3336	Turbine and power transmission equipment mfg.	3,916
3339	Other general purpose machinery manufacturing	24,257
3341	Computer and peripheral equipment mfg.	1,298
3342	Communications equipment manufacturing	1,742
3343	Audio and video equipment manufacturing	170
3344	Semiconductor and electronic component mfg.	6,243
3345	Electronic instrument manufacturing	10,709
3346	Magnetic media manufacturing and reproducing	249
3351	Electric lighting equipment manufacturing	-
3352	Household appliance manufacturing	-
3353	Electrical equipment manufacturing	8,165
3359	Other electrical equipment and component mfg.	6,823
3361	Motor vehicle manufacturing	21,850
3362	Motor vehicle body and trailer manufacturing	8,570
3363	Motor vehicle parts manufacturing	74,984
3364	Aerospace product and parts manufacturing	18,603
3365	Railroad rolling stock manufacturing	317
3366	Ship and boat building	148
3369	Other transportation equipment manufacturing	853
3391	Medical equipment and supplies manufacturing	8,748
3399	Other miscellaneous manufacturing	12,593