State of renewal:
Charting a new course for Indiana's economic growth and inclusion

Mark Muro, **Robert Maxim**, and **Jacob Whiton**
with **Yang You, Eli Byerly-Duke**, and **Monica Essig Aberg**

February 2021

Metropolitan Policy Program at BROOKINGS

TABLE OF **CONTENTS**

EXECUTIVE SUMMARY

There's been no escaping the COVID-19 pandemic, with its toll of hospitalizations, layoffs, and quarantines.

Every place in America has been affected, often in drastic ways, as the coronavirus hit home and laid bare—like an X-ray—an array of underlying economic and social challenges wherever it arrived.

And so it has been in Indiana. While it has managed, by some measures, one of the stronger recoveries from the initial crisis among states, the Hoosier State has also contended with major dislocations and challenges.

Not only did COVID-19 interrupt several years of relatively decent growth prior to the pandemic shock, but the pandemic and its impacts have intensified an array of concerns about the underlying health and resilience of the state's economy, ranging from its technological competitiveness (region by region) to its adaptability to the pay of its jobs.

In light of this, as Hoosiers begin to think ahead, the understandable impulse to simply "get back to normal" may not suffice.

Instead, Indiana—like other states—is facing a critical moment as it contemplates its post-pandemic future. Is the state prepared to challenge itself to go beyond its norms and focus on longer-term transformation? Or will it content itself with reverting to an imperfect pre-crisis status quo?

Such questions—which were already surfacing before the pandemic—are why in spring 2019, the Central Indiana Corporate Partnership (CICP) invited the Brookings Institution's Metropolitan Policy Program to provide a data-grounded economic assessment and actionable set of recommendations to inform the state's economic strategy at an important time. Envisioned as part of the Indiana GPS Project—a multistrand economic strategy effort spearheaded by CICP, assembling research from Brookings as well as the American Enterprise Institute (AEI) and its partner Economic Innovation Group (EIG), both in Washington, D.C.—the Brookings assessment and recommendations were conceived well before the COVID-19 crisis with an eye toward providing ideas for expanding Indiana's advanced industries and quality employment. With that said, the inquiry only gained in salience by taking on aspects of the current crisis.

Along these lines, the report that follows—"State of renewal: Charting a new course for Indiana's economic growth and inclusion"—draws a number of conclusions about the Indiana economy as it emerges from the COVID-19 crisis and considers how to catalyze a new era of state growth. In doing so, the report finds that:

1. INDIANA POSSESSES SIGNIFICANT STRENGTHS AS IT MOVES BEYOND THE WORST OF THE COVID-19 PANDEMIC, THOUGH DISPARITIES PERSIST.

Notwithstanding its especially deep initial plunge into the COVID-19 recession, Indiana was experiencing a relatively robust initial job rebound by the onset of the winter. Overall, the state's return from its pandemic lows has been relatively quick, with net payroll job losses for the year declining to 52,000 positions in November—or -1.7% of the state's total employment, the ninth-lowest figure among states.

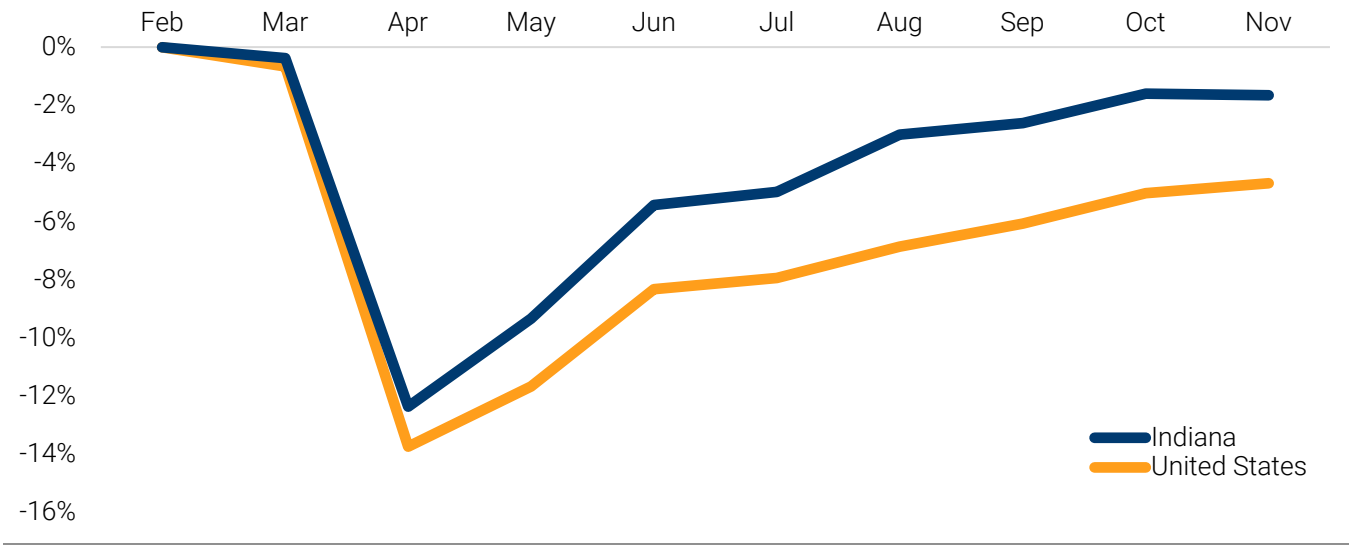
Contributing to this result has been the state's industry structure. With services at the forefront of job losses nationally, the state's high specialization in manufacturing (which reopened relatively quickly) and low reliance on tourism (a source of some of the crisis's worst job losses) have ensured that Indiana has been shielded from the gravest disruptions of the pandemic. Indiana's large transportation sector (including fulfillment and logistics) has also contributed to the state's rebound, meaning that—for now, at least—the state's sizable "make goods/move goods" sector has been important in staving off dislocation.

Still concerning, though, is the persistent unevenness of the recession, which continues to vary sharply across income levels, race, and geography. Data from Opportunity Insights reveals, for example, that while high- and medium-wage workers in Indiana have seen full or nearly full employment recovery, in October, low-wage workers were still contending with employment rates more than 17% below mid-January 2020 levels.

"State of renewal: Charting a new course for Indiana's economic growth and inclusion"—draws a number of conclusions about the Indiana economy as it emerges from the COVID-19 crisis and considers how to catalyze a new era of state growth.

By the onset of winter, Indiana's relatively strong rebound had gained back 87% of jobs the state had lost in 2020, although the recovery slowed in the fall

Total nonfarm employment in Indiana and US, not seasonally adjusted, February - November 2020



Note: November data is a preliminary estimate.
Source: Brookings analysis of BLS data.

Likewise, responses from the Census Bureau's Household Pulse Survey for mid-December report that half of Black and Latino or Hispanic Hoosiers resided in households that had experienced a loss of employment income since March. For white Hoosiers, the figure was 44%. And while unemployment rates in Indiana's regions had declined substantially by the fall, conditions varied and joblessness was still elevated, especially in the state's northern regions. Even so, the state's initial rebound has been relatively solid.

2. WITH THAT SAID, INDIANA'S PRE-PANDEMIC EMPLOYMENT AND PAY TRENDS RAISE QUESTIONS ABOUT THE LIKELY SHAPE OF ITS POST-PANDEMIC RECOVERY.

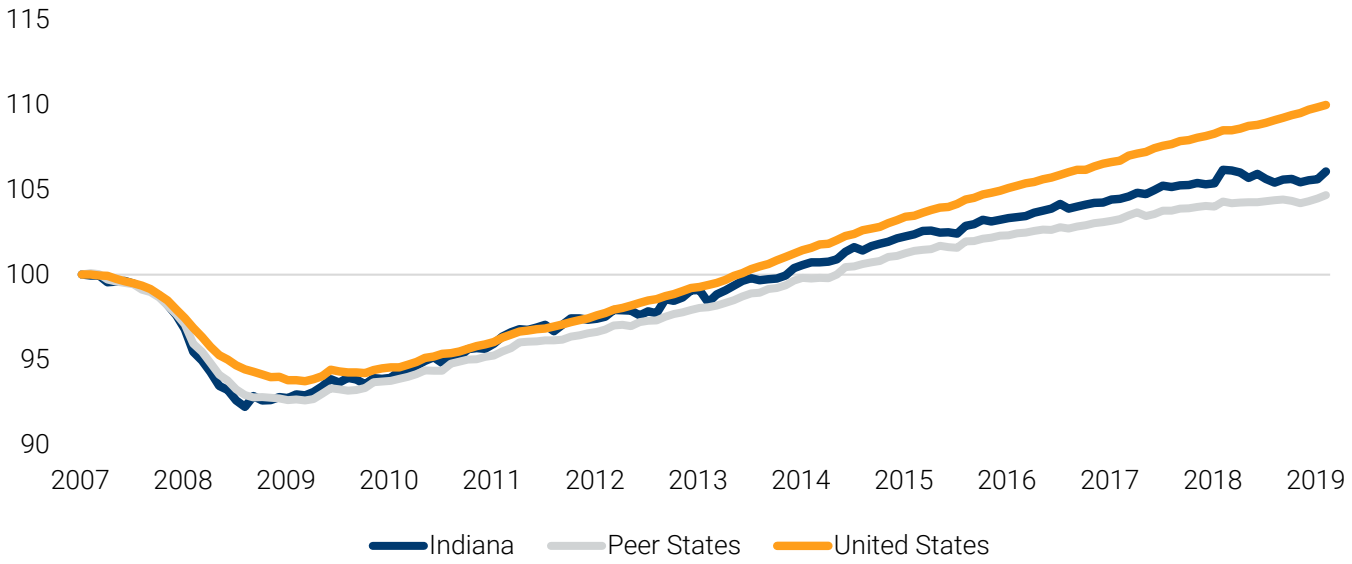
Indiana's pre-crisis norms on growth and pay, past recession recoveries, and family well-being signal vulnerabilities in the state's economic makeup, with implications for the nature of its longer-term recovery.

The vulnerabilities begin with growth and pay. On employment, the state's 0.5% compound annual growth rate (CAGR) in employment from 2007 to 2019 reflects a mixed story. As such, the state's employment growth lagged the national average of 0.8%, with the state having initially absorbed heavy job losses in manufacturing in the 2007-to-2009 recession. However, an export-driven manufacturing rebound then helped the state outpace its peer states' employment growth. In that sense, while employment growth has been slow by national standards, it has been above average for a Midwestern region still struggling with a regionwide loss of economic vitality.

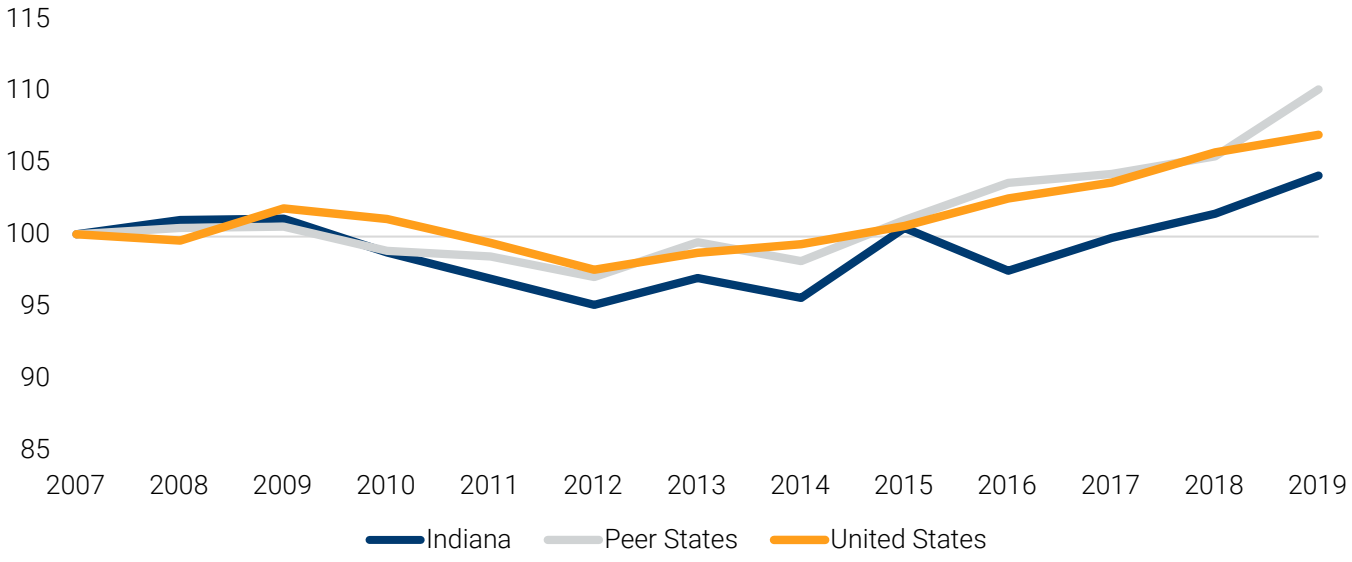
At the same time, though, earnings gains have underperformed. Nationwide, median annual earnings increased by just 0.6% a year in real terms from 2007 to 2019, to reach $36,600 per worker. By contrast, Indiana's gains were half that, with annual earnings growth registering at just 0.3%, allowing earnings to reach just $34,300. Only in the last pre-pandemic years did Indiana workers' earnings begin to grow in a sustained way, albeit at a slower pace than that of its peers.

Indiana managed respectable employment growth in the pre-pandemic decade, but its earnings gains underperformed

Total nonfarm employment (Dec. 2007 = 100), seasonally adjusted, December 2007 - January 2020



Real median hourly wage (2007 = 100), 2007 - 2019



Source: Brookings analysis BLS, BEA and the Economic Policy Institute's State of Working America Data Library data.

Also of concern are longer-term trends, including the state's experiences with recent recessions—an important indicator of resilience. Notwithstanding its sustained employment-growth edge compared to its regional peers, Indiana found itself knocked onto a slower growth trajectory after 2000, to the point that the state did not recover its May 2000 employment peak until May 2015. The nation as a whole, by contrast, recovered its February 2001 peak employment only four years later.

Even more disturbing, real hourly wage growth in Indiana has remained depressed since 2001, including in the wake of the 2007-to-2009 recession. Since 2000, Indiana's 0.5% per year real median wage growth trailed the national and peer-state rates and ranked 46th among states.

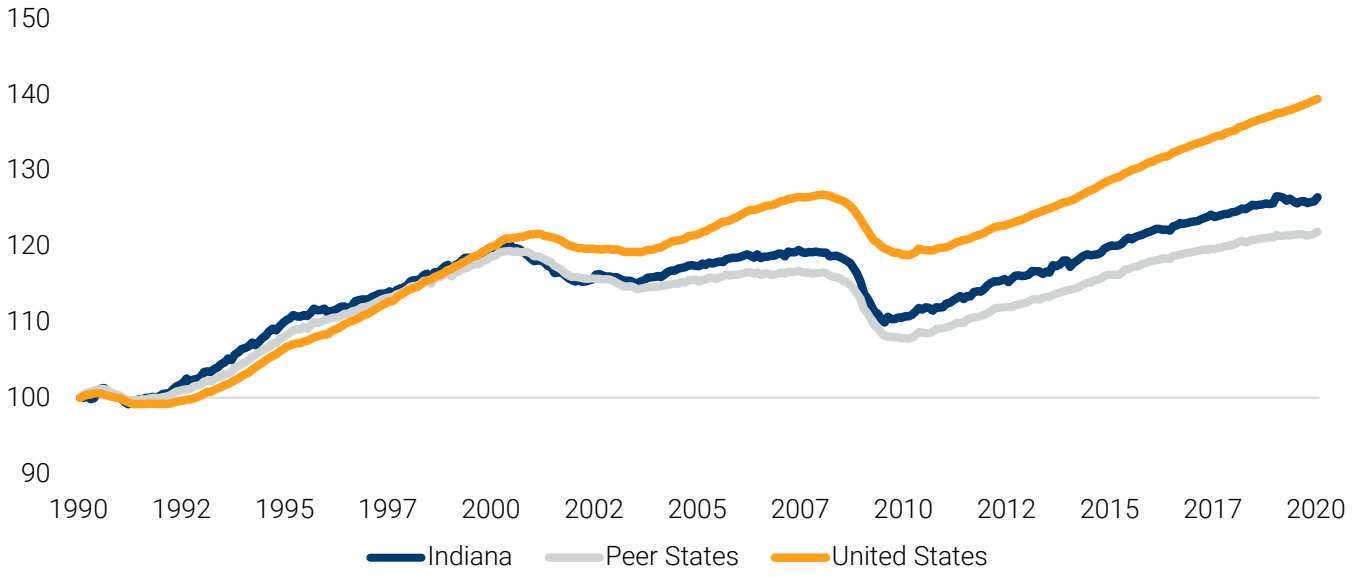
Together, the shocks of 2001 and 2007 to 2009 imposed major changes upon Indiana's economy—especially the 2001 recession, which corresponded with a surge of cheap imports from China in the wake of its accession to the World Trade Organization. The slow recoveries from these episodes represent a second caution about the future.

Finally, the human costs of two decades of stagnation represent a third source of uncertainty about what comes next. With the onset of the Great Recession, for example, the number of Hoosiers living in families that struggled to make ends meet—as indicated by a well-regarded "self-sufficiency standard" from the University of Washington—rose by over half a million people, from 1.4 million in 2007 to 1.93 million in 2011. By 2016, that total had fallen only slightly to 1.82 million—a figure still nearly 400,000 people higher than before the recession.

Altogether, about 30% of the state's population has been living in a struggling family since 2010, with only small declines in recent years—and this was before the onset of the COVID-19 pandemic. Less educated workers in the state and racial and ethnic minorities are especially overrepresented among the now likely swollen ranks of the struggling.

Indiana employment growth deteriorated in the wake of the recessions of 2001 and 2007 to 2009

Total nonfarm employment (Jan 1990 = 100), seasonally adjusted, January 1990 - January 2020



Source: Brookings analysis of BLS data.

The upshot is clear: As it anticipates recovery from the COVID-19 recession, Indiana does so having lost ground over the last two business cycles on several topline indicators of economic resilience.

3. 'PREEXISTING CONDITIONS' AFFECTING AT LEAST THREE KEY SUCCESS FACTORS UNDERLIE THE STATE'S TRENDS AND PRESENT CHALLENGES TO ITS RESILIENCE.

Work at Brookings and elsewhere has explored the special importance to prosperity of a short list of critical economic success factors. These factors include the dynamism of high-value "advanced" industries, the ability of the economy to "reallocate" jobs and workers from declining pursuits to promising ones, and the importance of inclusive growth that is broadly shared by all people and places. Such factors represent not just important takeaways from the resilience literature, but key influences on Indiana's long-run vitality—or lack thereof. They are the state's "preexisting conditions" when it comes to recovery and enhancement.

Indiana faces challenges on several of these important economic factors. Three findings warrant notice:

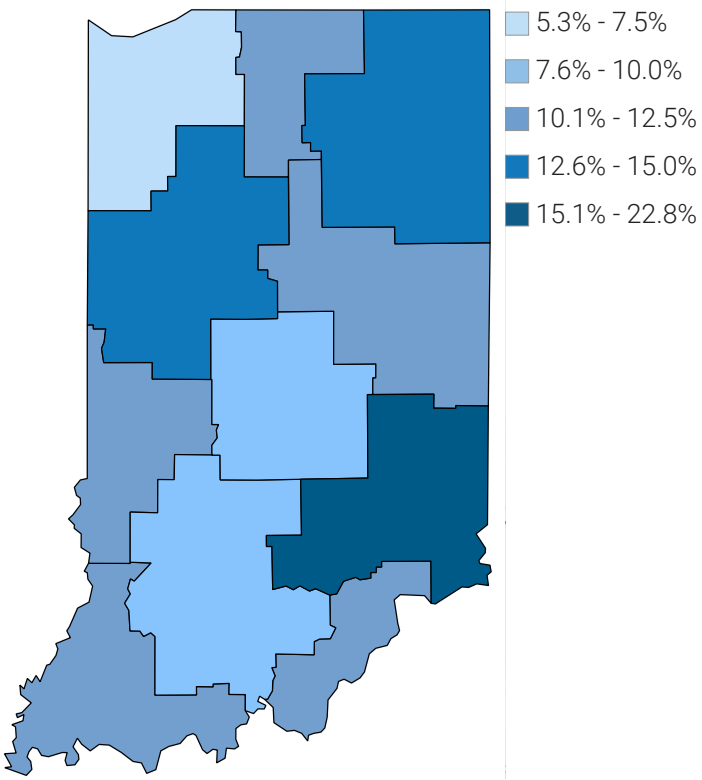
Advanced-industry sector competitiveness—reflected in productivity trends—has been slipping

Industry and firm productivity growth—the efficiency by which enterprises convert inputs into outputs—is critical to prosperity, but it has been declining in Indiana. Economy-wide, efficiency has slumped to levels around 15% below the national level. Especially concerning are slippages in the performance of the state's advanced-industry sector—a collection of 46 R&D- and STEM-worker-intensive industries in Indiana highlighted by Brookings and ranging from biopharma manufacturing and medical devices to automotive, R&D consulting, and technology.

These "crown jewel" industries operate in every Indiana region and county and support—both directly and indirectly—inordinate shares of the state's best-paying, highest-value economic activity. However, these high-productivity industries have also been stagnating. Between 2007 and 2019, advanced-industry productivity in Indiana grew at a paltry 0.4% annually, from $285,100 to $298,300 per worker. By comparison, real output per worker in advanced industries across the nation grew 2.7% a year during this period, reaching $375,000 per worker in 2019—implying a productivity gap of nearly 20% between the state and the nation. This represents a fall from the state's slight advanced-industry sector productivity *advantage* in 2007 of 5%.

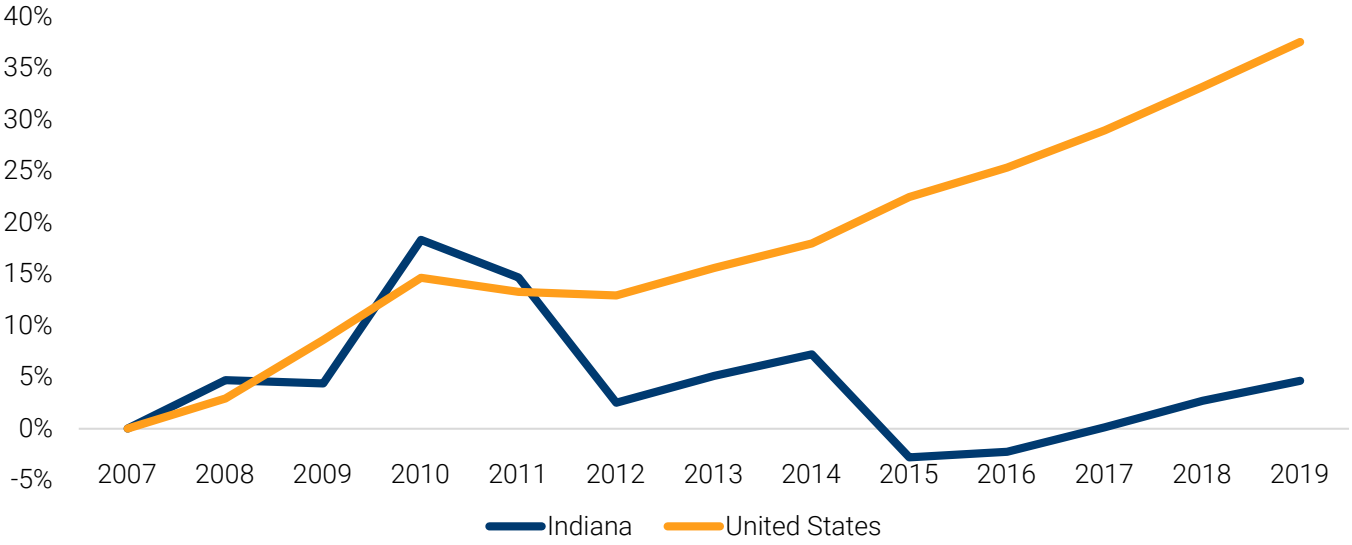
Advanced industries support quality employment—albeit at different concentrations—in all Indiana counties and in every region

Employment share in advanced industries by region, 2019



Source: Brookings analysis of Emsi data.

Indiana's advanced industries productivity growth has been languishing, falling behind the nation's since 2010
Advanced industries productivity - Percent change since 2007, 2007-2019



Source: Brookings analysis of Emsi and BEA data.

The state has struggled to adapt to recent economic shifts, which have created multiple "reallocation" challenges for industries and workers

Indiana's heavy specialization in manufacturing ensured that major changes in that sector—ranging from globalization and import competition to automation—brought significant firm and worker shifts in the last two recessions. For example, between 2001 and 2019—and especially in the recessions of 2000 to 2001 and 2007 to 2009—the state lost over 72,000 jobs in the manufacturing sector, which has long been a source of above-average wages for workers without a four-year college degree. At the same time, 228,000 jobs were created in the lower-paying hospitality, administrative services, and health care sectors.

The result of these shocks: Indiana's firm mix shifted abruptly toward low-skill service sectors, while thousands of workers struggled to undergo tough changes in jobs, industries, and skill demands, with a long-term depressive effect on wage growth and labor force participation.

Analysis in this report suggests the pandemic recession could portend new reallocation challenges tied to long-term structural changes and disruptions, such as more losses in manufacturing or the shift of retail activity from physical stores toward e-commerce. What's more, research from AEI's partner, the Economic Innovation Group, places Indiana 39th in the nation when it comes to the share of its employees working at new firms. That raises questions about the state's ability to readily create new jobs to replace those that may have been lost for good.

Indiana's economy has been providing too few good jobs

Good-paying work is critical in providing workers and families a livelihood and delivering the basic consumption that supports prosperous regions and communities. Accordingly, Brookings suggests—based on extensive research in Indiana—that "good jobs" pay at least a locally adjusted $40,700 a year and provide employer-sponsored health insurance. Under this metric, Indiana's store of good jobs has remained too small and grown too slowly.

To be sure, the state's stock of good jobs compares favorably to most states, given Indiana's manufacturing history. But even so, only 42% of the state's workforce possessed a good job between 2014 and 2018, the most recent period for which numbers are available. That means that roughly 58% of Hoosier workers—nearly three out of five—lacked a good job then.

Nor has the share of Hoosier workers in a good job increased appreciably in the last decade. Rather, it has remained the same. Also holding steady is Hoosiers' uneven access to good jobs: While 50% of male workers in Indiana are employed in a good job, only 33% of female workers are. Similar disparities cut across racial lines: Over 44% of white workers in the state have a good job, compared to just 30% and 25% of Black and Latino or Hispanic workers, respectively.

*

Going deeper into these success factors reveals several underlying dynamics that point to important strategy challenges—and opportunities.

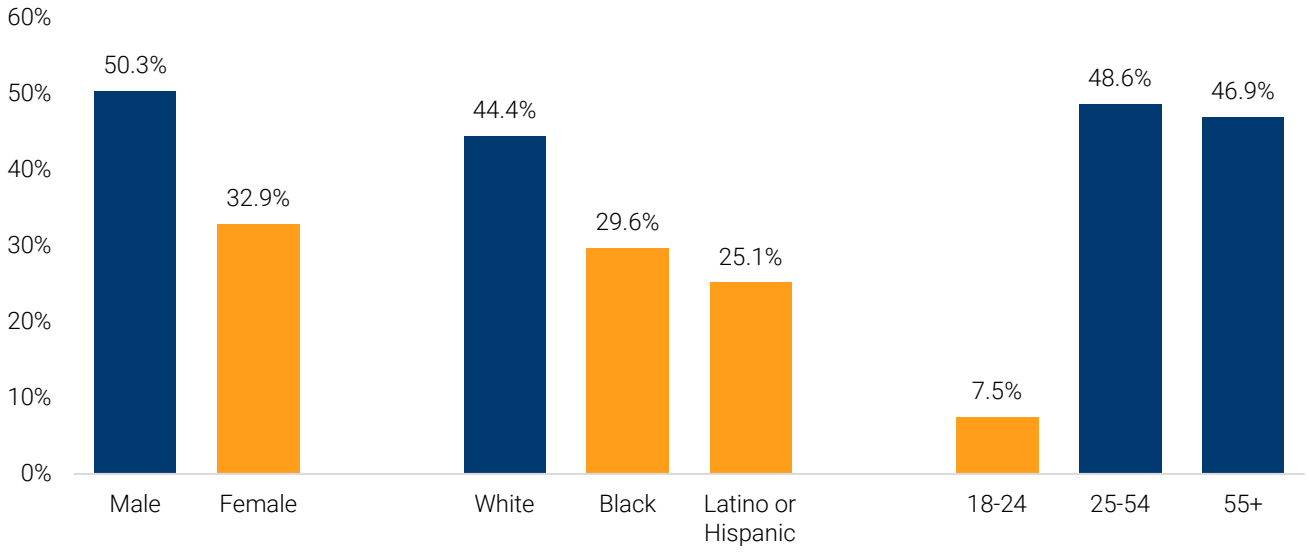
Insufficient digital investment is limiting advanced-industry sector competitiveness and the state's broader productivity

Underlying Indiana's productivity challenge are digital challenges. Information technology (IT) adoption is an increasingly important influence on productivity patterns given the "digitalization of everything" in the COVID-19 economy. And yet, digitalization has been proceeding too slowly in Indiana, to the detriment of productivity growth.

For one thing, Indiana ranks in the bottom third of states on Brookings's basic measure of economy-wide digitalization as reflected by the average digital intensity of its occupations. In addition, information on Indiana firms' capital expenditures depicts significant underinvestment in IT. Specifically, firm-level data from the tech-industry market research company Harte Hanks shows that in 2016, Indiana ranked just 37th among states for both its advanced-industry sector and whole-economy annual per

Men, white workers, and prime-age or older workers have greater access to good jobs; women, workers of color, and young people have less access

Share of workers in a good job by demographic group in Indiana, 2014-2018



Note: Asian American, Native American, Native Hawaiian, and those identifying as two or more races cannot be included because small sample sizes prevent statistically significant estimates.

Source: Brookings analysis of IPUMS USA 2014-18 5-year ACS microdata.

employee IT spending. Those levels—$12,300 and $7,400, respectively, compared to $25,000 and $11,100 nationally—ranked fifth and sixth among Indiana's peer states.

Similarly patchy are Indiana's broadband adoption rates, which interfere with business, job search, and education in both rural and urban areas. To be sure, Indiana's broadband adoption rate has increased from 60% to 65% since 2013. However, the state's 65% adoption rate remains in the fourth quintile of states—a concerning status that has been highlighted by the pandemic recession.

Thinner job supplies and various skill- and job-matching issues could slow worker transitions and wider reallocation

This is a problem because fast and favorable readjustments of firms and workers to new conditions speed recovery and maximize productivity and inclusive growth. But particular attributes of Indiana's reallocation environment could slow or complicate the state's job creation and labor market matching processes in the coming years.

On the job creation side, shortages in new-firm creation and investment in digital and other automation technologies could depress the state's supply of jobs in certain sectors or places. On the labor market side, skills disconnects—a problem everywhere—could slow job transitions and readjustment. For some, matching existing skills to new firms or industries will require challenging job searches. For others, the tendency of firms to upskill during downturns could complicate reemployment in enterprises replacing workers who performed "routine" automatable tasks with a mix of technology and more skilled workers. Even before the crisis, a third of Indiana jobs required postsecondary education, but only a quarter of working-age adults had that requisite level of education.

Meanwhile, telework—which will likely increase permanently—poses additional challenges, particularly for workers who lack digital skills or broadband access.

Job quality has suffered amid difficult economic transitions

Beneath the shortage of good jobs lie massive economic changes that have challenged state policy's ability to keep up. For example, the interlinked trends of globalization and automation have constrained mid-level wage gains in Indiana more than in most places. Here, it bears saying again that trade and technology each bring substantial benefits. But it is also true that each trend has almost certainly had negative wage effects on middle- and lower-skilled workers, especially given the state's manufacturing-heavy industry mix.

On trade, Brookings analysis using a method and data from economist David Autor and colleagues suggests that, between 1990 and 2007, Hoosier wage declines attributable to Chinese import competition were the highest in the Midwest, and the ninth-largest in the country. On technology, Brookings calculations using data from the International Federation of Robotics and economists Daron Acemoglu and Pascual Restrepo suggest automation-induced wage declines over the same timespan were likely higher than in any other state. Brookings also concludes that nearly one-third of Indiana jobs are now highly susceptible to automation employing existing technologies—the highest share in the country.

Over time, these trends have helped to "hollow out" the state's wage distribution, erasing middle-class jobs and forcing displaced workers to compete for lower-wage service work. The same can be said for related management paradigms involving outsourcing and the so-called "contingent" or gig economy, which have complicated workers' ability to secure higher wages and more benefits. In the face of all of this, Indiana policy innovation has simply lagged behind market changes, leaving many workers to contend with excessively low wages, benefits limits, and greater precariousness.

4. INDIANA SHOULD BUILD RESILIENCE INTO A RECOVERY THAT PROMOTES TRUE RENEWAL.

Indiana has an opportunity to elevate its trajectory. But to do that, it needs to do more than just manage a serviceable recovery from the immediate COVID-19 shock and recession.

Rather, the state needs to begin to address some of the deeper economic challenges it faced prior to the pandemic that could limit the dimensions of its recovery. Indiana should shoot for enhancement—not just repair.

Specifically, the state should begin improving its standing on key resilience factors by taking action to accelerate technology adoption, facilitate faster industry and worker adaptation, and promote economic inclusion.

Along these lines, the state should consider a number of linked initiatives and action steps aimed at both mitigating the worst of the crisis and systematically upgrading the state's growth platform for the next decade. Specifically, the state and its regional, civic, and business partners should take steps in the coming year or two to:

Accelerate digital adoption to drive economic dynamism and competitiveness. Promoting faster and broader digital adoption remains one of the best ways to rout the state's productivity slump and generate quality jobs and more dynamic prosperity. The state should pursue three initiatives:

- Drive digital adoption with a "Digital Indiana" initiative to deploy an awareness campaign and business support offerings to increase IT adoption by Indiana firms—especially small and medium-sized enterprises—in all industries, as does the state's EASE program and Manufacturing Readiness Grants in that sector
- Encourage digital skills development for Hoosiers by adding a digital skills requirement to the Indiana College Core (formerly the Statewide Transfer General Education Core)
- Begin to solve the state's broadband disconnects

For their part, regional actors and local industry networks can play a critical role in helping the state raise digital awareness, deliver digital skills development, and begin to tackle local broadband challenges.

Promote favorable job creation and worker transitions to allow for a beneficial "rewiring" of the economy. Favorable industry and work reallocations—from less desirable to more desirable configurations—are going to be crucial for the economy to change and adapt while helping displaced workers reconnect to sustainable work. Top priority moves would:

- Leverage incremental income tax gains to fund regional advanced-industry sector growth initiatives, with investments delivered by both the state and regional intermediaries
- Enhance entrepreneurship and small new business development, with a focus on entrepreneurs of color
- Better leverage unemployment insurance (UI) and work-sharing to boost employment and economic growth
- Promote more effective worker adjustment by continuing to support the Next Level Jobs program and the Workforce Ready Grant

In addition, the state should in the next few years more strongly support workers' searches for the right job and employer as the economy recovers and the labor market tightens. To do so, the state should:

- Enhance work connections with a statewide online matching platform

For their part, regional actors and local industry networks can continue to drive growth in their own advanced sectors while designing, aligning, and delivering industry-relevant, worker-supportive education, training, and job-matching innovations.

Do more to support workers who aren't in good jobs so as to promote inclusion and broadly shared prosperity. Neither a broad digital surge nor facilitating optimal reallocation of the economy and labor market will by themselves be sufficient to help the state's struggling workers. Large forces—including globalization and technology—will continue to pose challenges for the

widespread creation of good jobs, whether in Indiana or elsewhere. Therefore, Indiana—like every other state—will need to accept that it must attend more to the basic needs of what will likely be a sizable pool of struggling workers for the foreseeable future. In that vein, the state could:

- Establish a "Choice Employers" designation and provide such employers with premium supports to encourage them to create more good jobs
- Enlarge the state's existing Earned Income Tax Credit and pay it quarterly to boost worker income and predictability
- Authorize a state panel to explore a Medicaid buy-in program for able-bodied adults
- Enact a comprehensive child care agenda to support working families
- Enact a state-sponsored automatic IRA to encourage greater retirement savings

In addition, the state may want in the coming years to examine a number of other recommendations that would help boost job quality for low-income Hoosiers. In that spirit, the state could:

- Enact statewide paid sick and family leave
- Expand access to benefits and protections to contingent workers, gig workers, and independent contractors
- Enact protections for temporary and on-call workers

For their part, regional organizations and local business networks can focus on good jobs in their own communities and experiment with new ways to support good wages and provide both educational pathways and supportive services for working families.

Indiana has an opportunity to elevate its trajectory. But to do that, it needs to do more than just manage a serviceable recovery from the immediate COVID-19 shock and recession. Rather, the state needs to begin to address some of the deeper economic challenges it faced prior to the pandemic that could limit the dimensions of its recovery. Indiana should shoot for enhancement—not just repair.

1 INTRODUCTION

There has been no escaping the COVID-19 pandemic, with its dismal toll of hospitalizations, layoffs, and quarantines.

Every place in America has been affected, often in drastic ways, as the coronavirus hit home and laid bare—like an X-ray—an array of underlying economic and social challenges wherever it arrived.

And so it has been in Indiana, where COVID-19 did not just temporarily interrupt the good times. While the Hoosier State had, by some measures, the strongest economy in recent memory prior to the onset of the pandemic, the fact remains that the last two decades have also brought structural economic changes to the Midwest that have slowed growth in key industries, dislocated thousands of workers, and depressed wage growth.

As the following analysis shows, Indiana's pre-crisis economy displayed serious growth and inequality challenges that, even in the absence of the economic shocks of 2020, demanded more ambitious transformation. In recognition of these data-driven realities—and, in particular, after a year of historic tumult, quarantines, and recession—the people of Indiana, like the rest of the country, are justifiably eager and determined to turn the page and rebuild a stronger future.

Turning the page, however, isn't possible without addressing the state and region's structural economic changes. For example:

- The state's advanced industries—its most critical sources of prosperity—have been ceding competitiveness for more than a decade due to insufficient productivity growth.
- The state's labor force nonparticipation rate for men without a bachelor's degree has been rising, with a dip only in the last few years before the pandemic recession.
- Clear and growing educational, racial, and gender divides have characterized virtually every measure of economic well-being in Indiana.

Perhaps most concerning is the fact that Indiana has struggled to recover from recent recessions, reflecting a slow decline of its economic resilience. During the last two recessions, the state has lost ground in relation to its competitors and the nation.

Indiana, in short, is facing a critical choice about its future. Is the state prepared to challenge itself and go beyond its norms and focus on longer-term enhancement? Or will it content itself with reverting to the pre-crisis status quo?

This report concludes that the state needs to go beyond a return to normalcy. Indiana is already competing in several races with other states: a race to keep up with broad digitalization, as technology accelerates in every realm; a race to facilitate a favorable "rewiring" of the post-crisis economy through job creation and worker adjustment; and a race to promote economic inclusion amid widened divides. The states that succeed in these races will emerge from the pandemic recession stronger. Those that don't will lose ground.

Given that, Indiana needs to push forward, even amid uncertainty and tight budgets.

To its credit, the state has already begun to respond to longer-term challenges despite the immediate crisis. Early on, the state government moved to temporarily add new certificate programs and expanded grant eligibility to its Next Level Jobs offerings as part of the Rapid Recovery for a Better Future initiative. And in May, the Indiana Economic Development Corporation (IEDC) board of directors approved $10 million to launch the Economic Activity Stabilization and Enhancement (EASE) program, aimed at supporting technology and operational advancements in the manufacturing industry, which has long been a key driver of the state's economy.

Since then, recent events have confirmed the state's status as a world-class hub of advanced manufacturing, especially in biopharmaceutical medicines and related products. Catalent's Bloomington facility has been a center of public health attention as the company scaled up production of 100 million dosages of Moderna's long-awaited COVID-19 vaccine. And late last year, the second-largest animal health company in the world, Elanco, announced that it would be establishing its global headquarters at a former GM site just south of the Indianapolis Zoo.

But Indiana still needs to consider the big picture surrounding its key industries, the broader economy, and the needs of its workers. Specifically, what Indiana needs—and needed even before the pandemic recession—is a fact-based, third-party analysis of the state's competitive position and economic development opportunities.

Which is why in spring 2019, the Central Indiana Corporate Partnership (CICP) invited the Brookings Institution's Metropolitan Policy Program to provide a data-driven economic assessment and actionable recommendations for the state's economic development planning.

Envisioned as part of the "Indiana GPS Project"—a multi-strand economic strategy effort spearheaded by CICP assembling research from Brookings as well as the American Enterprise Institute (AEI) in Washington, D.C. and its partner Economic Innovation Group (EIG),

also in Washington, D.C.—the Brookings assessment and recommendations were conceived well before the COVID-19 crisis with an eye to providing ideas for expanding Indiana's advanced industries and quality employment. With that said, the inquiry only gained in salience by taking on aspects of the current crisis.

Along these lines, Brookings—working closely with CICP—launched a wide-ranging research process starting in fall 2019 that drew together extensive literature review, fresh economic analyses, special topics study, and substantial best-practice and policy research.

As part of the yearlong process, Brookings and CICP conducted structured focus groups in each of the 11 regions delineated by the study process. These sessions—hosted by local economic development intermediaries, at first in person, then by video conference given pandemic-related travel and meeting limitations—allowed the inquiry to benefit from extensive input from over 350 Hoosiers residing across the state. Simultaneously, AEI and EIG scholars produced parallel survey, demographic, and real estate development analyses.

Out of this process has emerged the following assessment of the state's present situation, which explains why economic transformation is needed and what kinds of actions can begin to bring it about.

The analysis begins by recounting some of the main impacts of the COVID-19 recession on Indiana as a way to situate the state's longer-term economic situation. The section shows that, while seemingly aberrational, the recession has in fact highlighted longer-term vulnerabilities of Indiana's economy—namely, its slipping vitality and unevenness.

Section three of the report assesses the performance of the Indiana economy, while the fourth section digs deeper into economic trends to highlight several specific, policy-relevant resilience challenges the state economy faces.

The report's final section advances an ambitious but achievable set of strategy initiatives and action steps that would help Indiana move beyond a simple return to normalcy, and begin the work of broader economic transformation.

This report, in sum, is not mainly focused on analyzing the state's immediate economic situation or documenting the impacts of the latest crisis. Rather, its aim is to provide a broad review of Indiana's recent economic trends and offer guidance for policymakers hoping to make the type of sustained economic and social investments that can drive future prosperity.

The work ahead won't be easy or cost-free. But once these challenges and solutions are understood, Indiana's public, business, and civic leaders will be better equipped to rise to the occasion and position the state for a bright future—one available to Hoosiers from all backgrounds and in all regions.

2 INDIANA'S PANDEMIC YEAR

As Indiana works to ride out the COVID-19 pandemic, the associated recession, and a continuing racial justice reckoning, the state is also contending with longer-standing economic challenges that the crises of 2020 have laid bare.

A STRONG REBOUND, BUT WITH STRAINS

Indiana's robust initial rebound from the COVID-19 economic crisis may suggest to some that the pandemic recession can be viewed as more an aberration than a warning.

Indeed, the state's high reliance on manufacturing (which for the most part reopened for business after a relatively short closure) and low reliance on tourism (which protected the state from some of the worst employment losses) led to relatively modest year-end employment losses as a share of the economy. The state's specialization in the surging transportation and logistics sector has also contributed to its relatively strong initial recovery.

As a result, the economy as a whole had by November recovered 336,400 out of the 388,500 total nonfarm payroll jobs (87%) it had shed by April, leaving a relatively modest net shortfall of 52,000 jobs for the year.

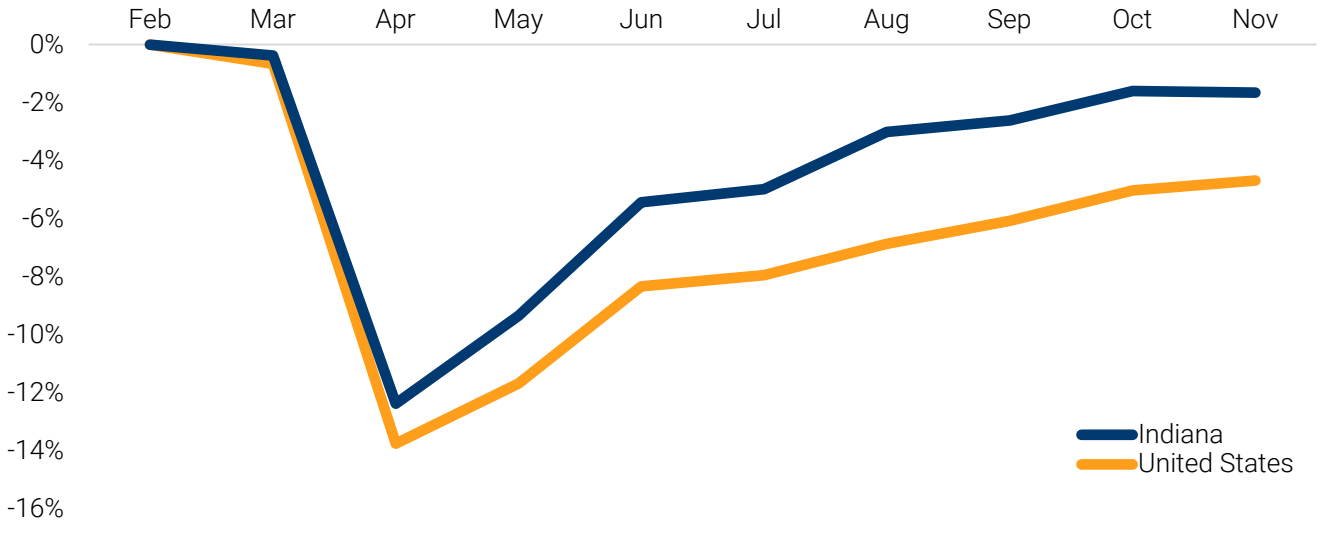
Over the same period, the unemployment rate in Indiana receded from 17% to 4.9%. As a result, the state's initial rebound from the pandemic has been relatively rapid, with net job losses for the year running at just 1.7% in November—the ninth-lowest figure among states.

However, the state's encouraging COVID-19 rebound cannot obscure a number of troubling issues the crisis has raised about the overall Indiana economy. For one thing, the spring employment crash erased all of the state's output and job gains since the 2007 to 2009 Great Recession, and resurfaced unease about Indiana's history of tough business cycles. Similarly, the abruptness and scale of the crash and subsequent surge of unemployment claims underscored the precariousness of work for many Hoosiers, even in good times.

And then there is the fact that the current rebound exhibits continued patchiness, disruption, and

Figure 1. By the end of November, Indiana had recovered 87% of the jobs it lost in 2020, though gains were slowing by year's end

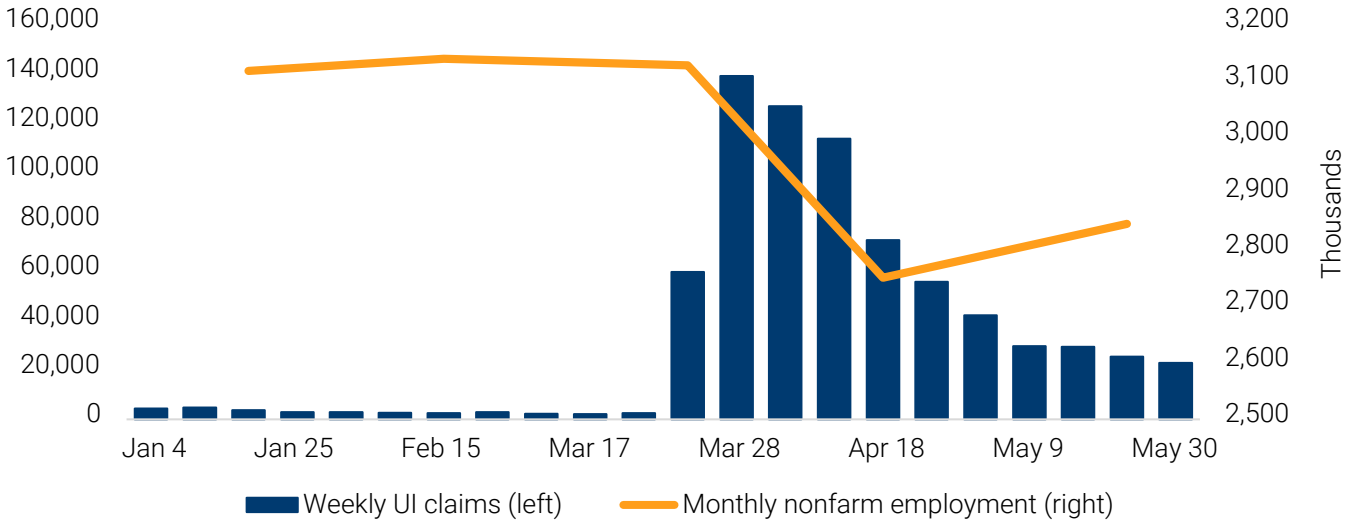
Total nonfarm employment in Indiana and US, not seasonally adjusted, February - November 2020



Note: November data is a preliminary estimate.
Source: Brookings analysis of BLS data.

Figure 2. Emergency social distancing measures ensured that the pandemic recession began with an abrupt and massive shock

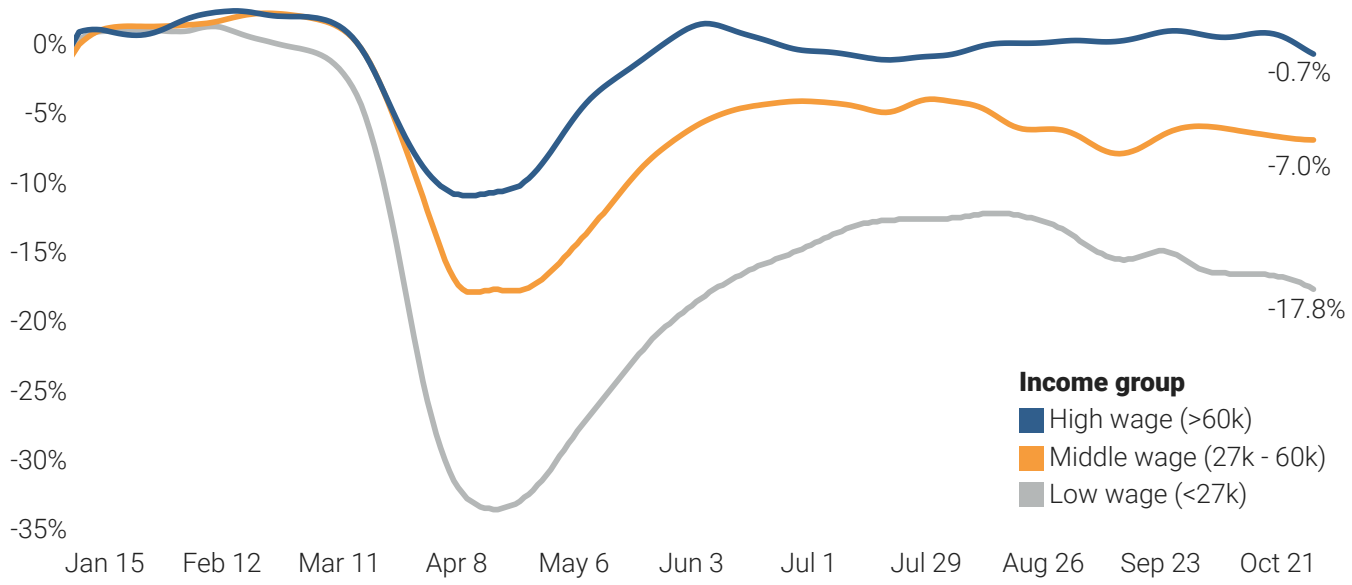
Unemployment claims and job losses in Indiana, January - May 2020



Source: Brookings analysis of BLS and Indiana Department of Workforce Development data.

Figure 3. Well-paid workers have seen a stronger recovery than lower-paid workers

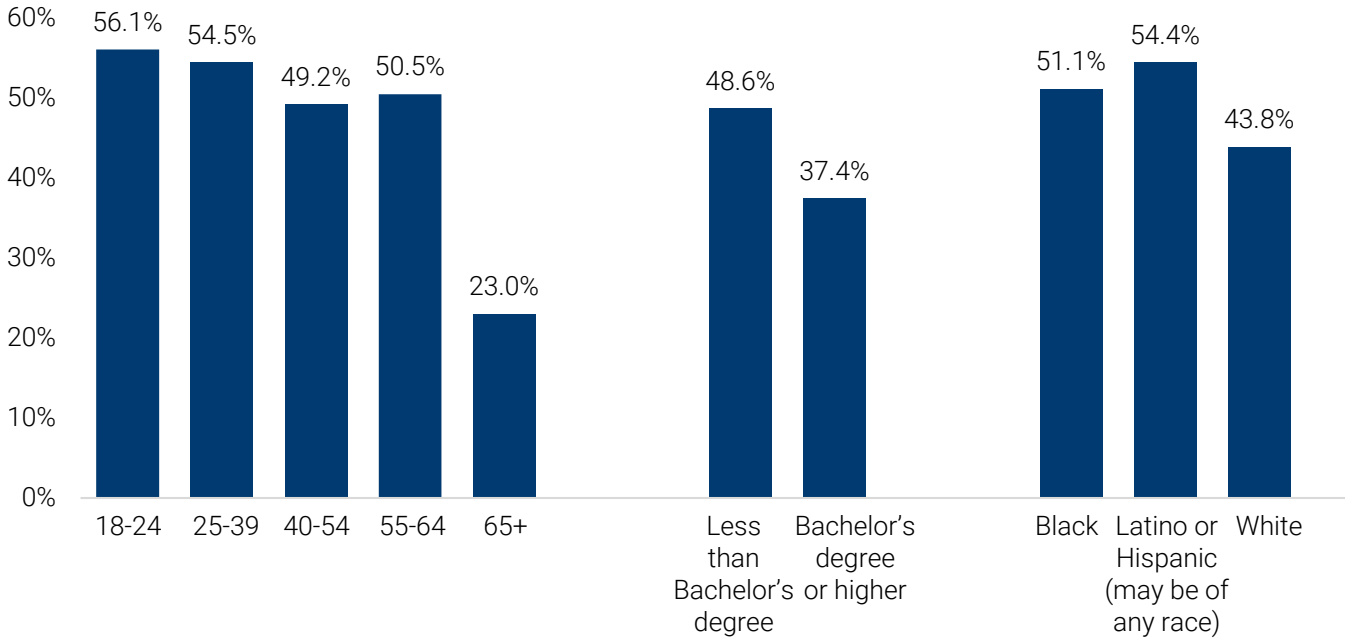
Employment change by income group in Indiana, January 15 - October 21



Source: Brookings analysis of Opportunity Insights data.

Figure 4. Black and Latino or Hispanic people in Indiana have experienced substantially greater losses of employment income than white people

Experienced loss of employment income since March 13, 2020 (for self or household member) by selected characteristics, Indiana, December 9 - December 21



Note: Since these data are experimental, sample sizes may be small and the standard errors may be large. Asian Americans are not shown due to a high standard error; Native Americans, Native Hawaiians, and people identifying as two or more races are not shown because the Census Bureau does not break out data for those groups. Calculations exclude participants who did not report income data.
Source: Brookings analysis of the Census Bureau's Household Pulse Survey.

disparities. For example, manufacturing employment levels were still down 30,000 positions in November, and the pace of the state's recovery was slowing by winter.

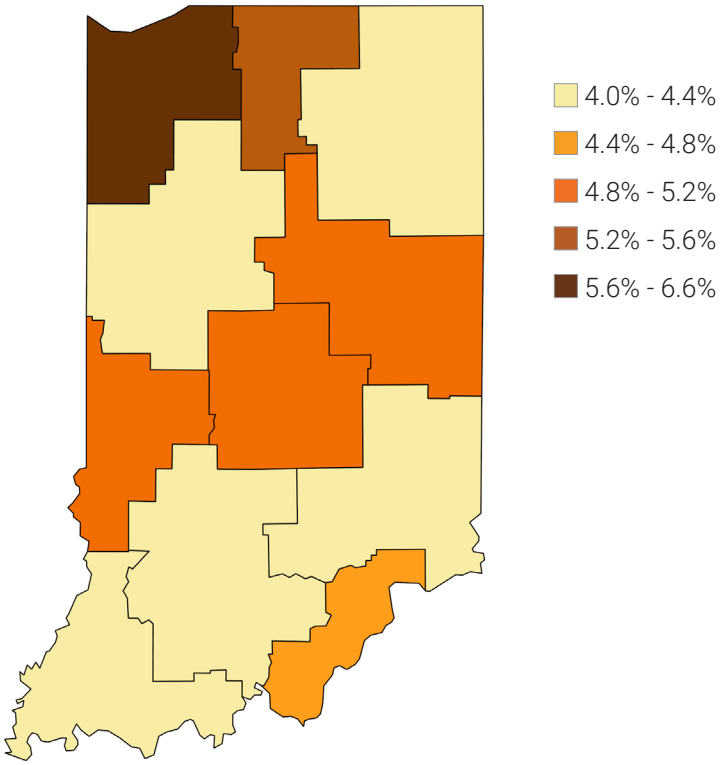
Likewise, sharp disparities have lingered long after the initial crisis. Data from Opportunity Insights reveals that while high- and medium-wage Indiana workers were seeing nearly full employment recovery in October, low-wage workers were still contending with employment rates more than 17% below mid-January levels. Similarly, responses from the Census Bureau's Household Pulse Survey for mid-December report that over half of Black and Latino or Hispanic people in Indiana resided in households that had experienced a loss of employment income since March. For white Indiana residents, the figure was 44%.

Recovery has also been geographically uneven. While Indiana's unemployment rate had declined substantially by the fall, conditions varied across regions and joblessness was still elevated to different degrees, especially in the northern half of the state.

In sum, while the pandemic recession has begun to recede, its major effects and aftermath raise questions about longer-standing issues in need of consideration.

Map 1. Unemployment rates are quite uneven across Indiana regions even in the winter

Unemployment rate by region, November 2020



Note: November data is a preliminary estimate.
Source: Brookings analysis of BLS data.

The encouraging COVID-19 rebound cannot obscure a number of troubling issues the crisis has raised about the overall Indiana economy. For one thing, the spring employment crash erased all of the state's output and job gains since the 2007 to 2009 Great Recession, and resurfaced unease about Indiana's history of tough business cycles. Similarly, the abruptness and scale of the crash and subsequent surge of unemployment claims underscored the precariousness of work for many Hoosiers, even in good times.

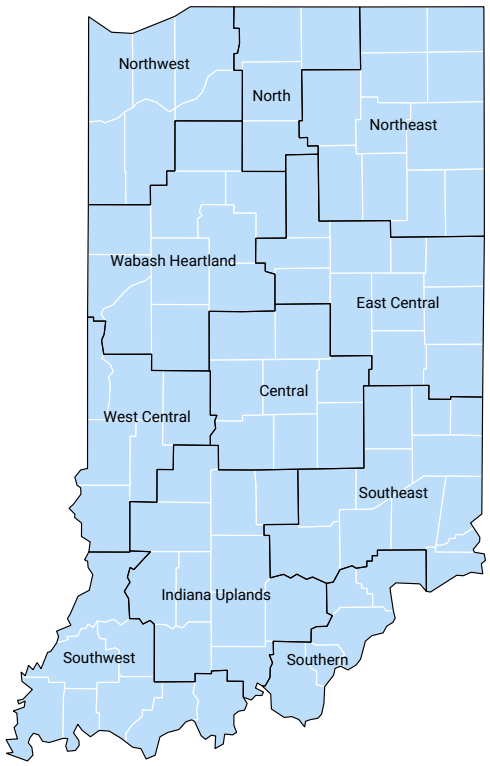
Defining intrastate regions in Indiana

Hoosiers know there is no single way to define the economic regions of Indiana given the complex nature of the state's industries, labor markets, and institutions. The lack of consistent regional definitions maintained by state government agencies underscores this, presenting a challenge for studying the regional nature of economies.

Given that, this report has taken the liberty of delineating its own set of Indiana regions. Reflecting local commuting patterns, economic linkages, and the presence of key regional actors, a Brookings/CICP analysis identifies 11 significant regions, each consisting of four to 12 counties. On average, the regions encompass about 3,300 square miles each, and are anchored in most cases by at least one medium-sized or small metropolitan area. As such, the regional definitions adopted here are intended to offer a convenient, functional understanding for how the state's economy is organized.

In any event, the regions with their principal metropolitan areas (in parentheses) are: **Northwest Indiana** (Gary/Hammond/East Chicago); **Northern Indiana** (South Bend/Elkhart/Mishawaka); **Northeast Indiana** (Fort Wayne); Wabash Heartland (Lafayette); **East Central Indiana** (Kokomo/Muncie/Anderson); **West Central Indiana** (Terre Haute); **Central Indiana** (Indianapolis); **Indiana Uplands** (Bloomington); **Southeast Indiana** (Columbus); Southwest Indiana (Evansville); **Southern Indiana** (New Albany/Jeffersonville).

Map 2. Indiana study regions



Source: Authors.

For more on Indiana's regions see: **http://Indianagpsproject.com/explore-regions/**.

INDIANA'S 'PREEXISTING CONDITIONS'

Indiana's pre-pandemic economy had its own vulnerabilities. Specifically, passable employment growth in recent decades (by Midwestern standards) has been accompanied by disappointing wage growth.

On employment, Indiana's 0.5% compound annual growth rate (CAGR) in employment from 2007 to 2019 ranked substantially below the national average of 0.8%, with the state having initially absorbed heavy job losses in manufacturing in the 2007 to 2009 recession. However, thanks in part to an export-driven manufacturing rebound, the state outpaced both national and peer-state employment growth in the first years of the post-2009 recovery, and managed to outpace its peer states' 0.3% average growth for the whole period (Figure 5).[1]

In that sense, while Indiana's employment growth has been slow by national standards, it has been above-average for a Midwestern region still struggling with a regionwide loss of economic vitality.

Peer-state comparisons

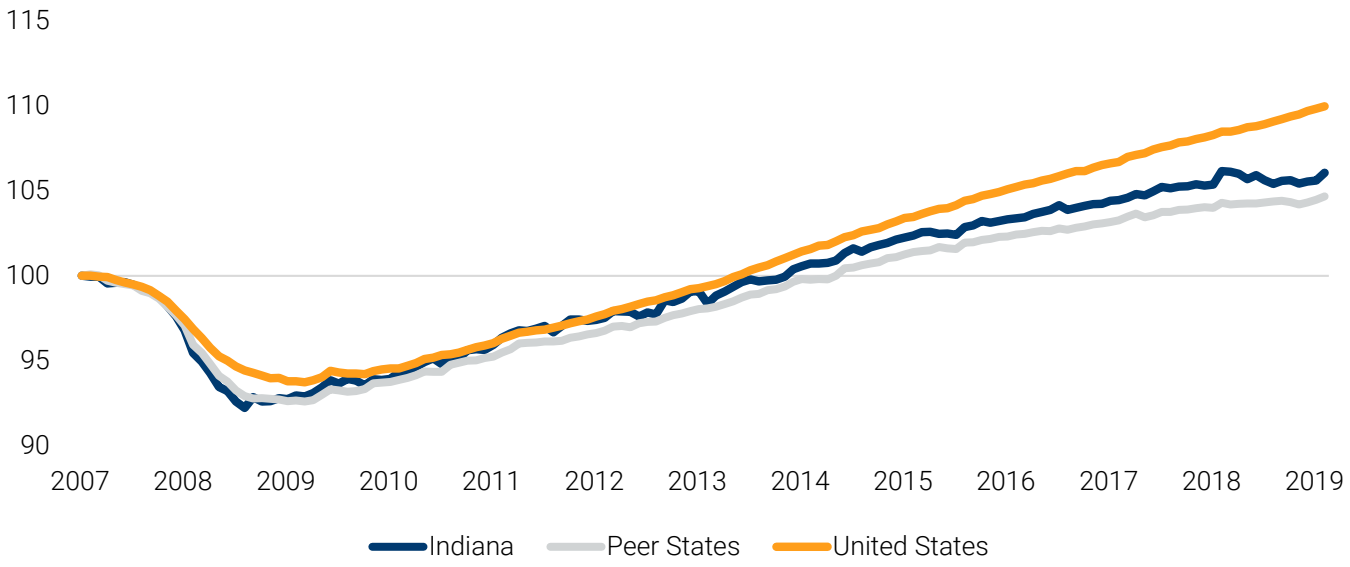
In addition to straight Indiana trend reporting, some analysis in this report compares the state against six benchmark peers to further assess Indiana's competitive position. The six peer states are **Illinois**, **Kentucky**, **Michigan**, **Ohio**, **Tennessee**, and **Wisconsin**.

These states were selected based on several factors, including their regional proximity, shared manufacturing history, current manufacturing density, and expert input about economic trends, institutions, and competitor status, especially with regard to advanced industries.

With that said, pallid earnings growth signaled deeper challenges. Notwithstanding the state's steady job creation, workers' earnings gains underperformed compared to both the nation and peer states through the pre-pandemic decade.

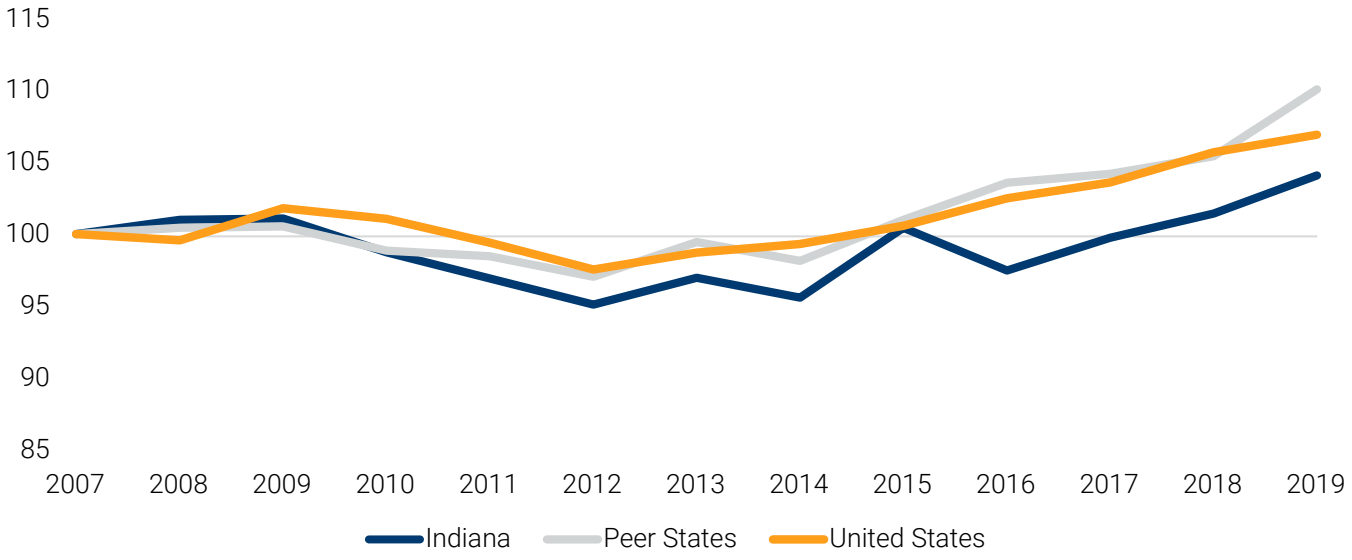
Figure 5. While Indiana added jobs faster than its peer states in the last decade, it still lagged the nation as a whole

Total nonfarm employment (Dec. 2007 = 100), seasonally adjusted, December 2007 - January 2020



Source: Brookings analysis of BLS data.

Figure 6. Indiana earnings gains underperformed through the pre-pandemic decade
Real median hourly wage (2007 = 100), 2007 - 2019



Source: Brookings analysis of BEA and the Economic Policy Institute's State of Working America Data Library data.

Nationwide, median annual earnings increased by just 0.6% per year in real terms from 2007 to 2019, raising median yearly wages to $36,600 per worker. In Indiana, however, the gains were half that—annual earnings growth registered just 0.3%, allowing yearly median earnings to reach only $34,300. Only in the last few pre-pandemic years did Indiana workers' earnings begin to grow in a sustained way, albeit at a slower pace than that of its peers. But even so, Indiana's real median wage growth in the last decade sunk to less than half the peer-state norm.

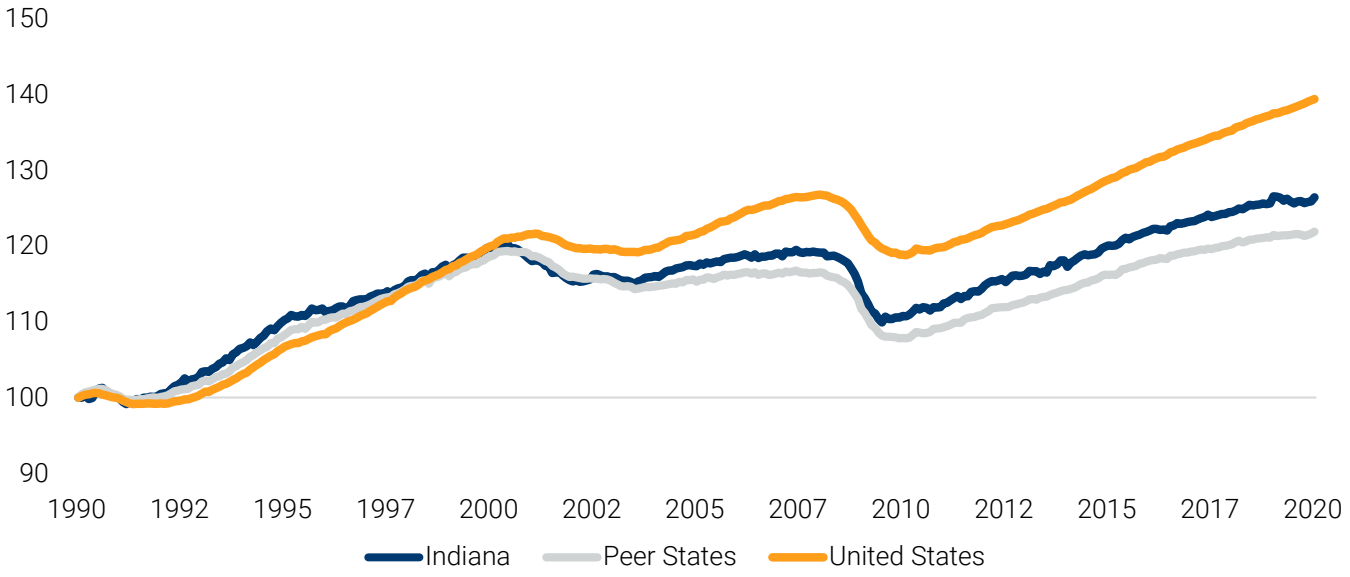
Nor were the last decade's mixed employment and pay trends a new development. Rather, the state's middling economic performance prior to the pandemic reflected a longer-standing, two-decade-long slippage in state and regional dynamism.

The recessions of 2001 and 2007 to 2009 hit Indiana hard. Together, those shocks imposed major changes on the state's economic performance, especially in the wake of the 2001 recession, which corresponded with a surge of cheap imports from China after its accession into the World Trade Organization.[2]

In this regard, tracking Indiana's employment growth since those recessions reveals that the state's journey through the last two shocks coincided with appreciably worsened employment and pay trajectories. Figure 7 shows that while Indiana's employment gains surged in the aftermath of the 1989-to-1991 recession and surpassed those of its peer states, its performance deteriorated in the wake of the recessions of 2001 and 2007 to 2009, both relative to its pace during the 1991-to-2001 recovery period and to the nation as a whole.

Figure 7. Indiana employment growth deteriorated in the wake of the recessions of 2001 and 2007 to 2009

Total nonfarm employment (Jan 1990 = 100), seasonally adjusted, January 1990 - January 2020



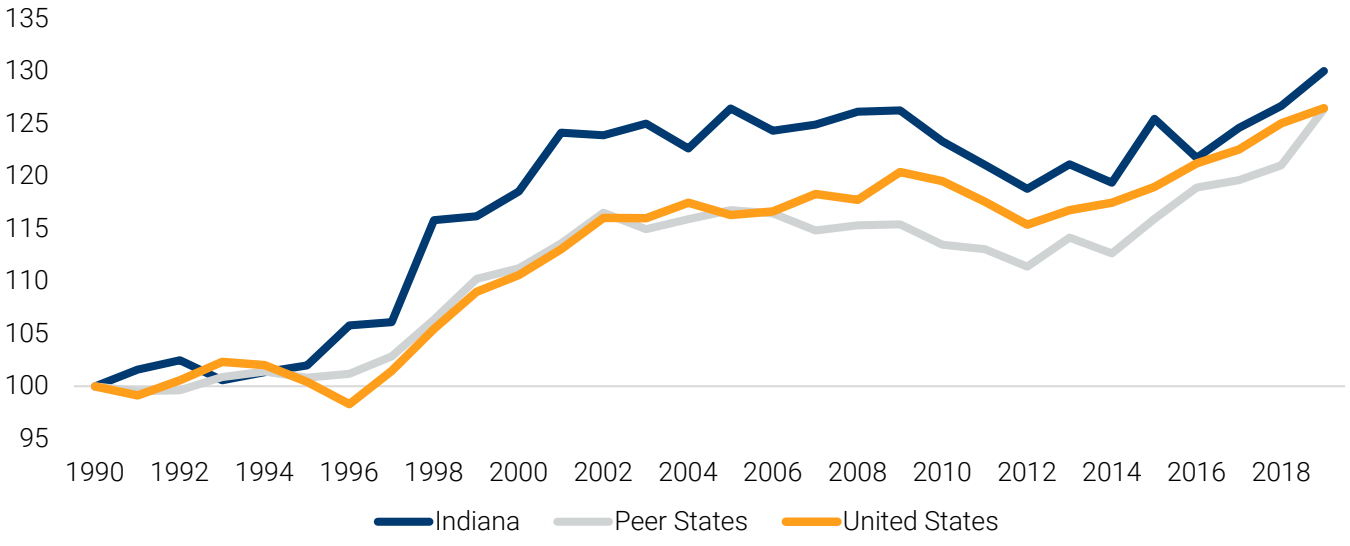
Source: Brookings analysis of BLS data.

Shockingly, despite its decent employment gains after 2009, Indiana did not recover its May 2000 peak employment until May 2015, fully 15 years later. The U.S. overall, by contrast, took only four years to recover its February 2001 peak employment.

Likewise, real hourly wage growth has been stagnating since the 2001 recession. Figure 8 shows that after a surge in the 1990s, wage growth in Indiana ceased with the onset of the 2001 downturn and remained flat to negative in the subsequent two expansions.

Figure 8. After strong gains in the 1990s, Indiana's real median hourly wages have been flat since the 2001 recession

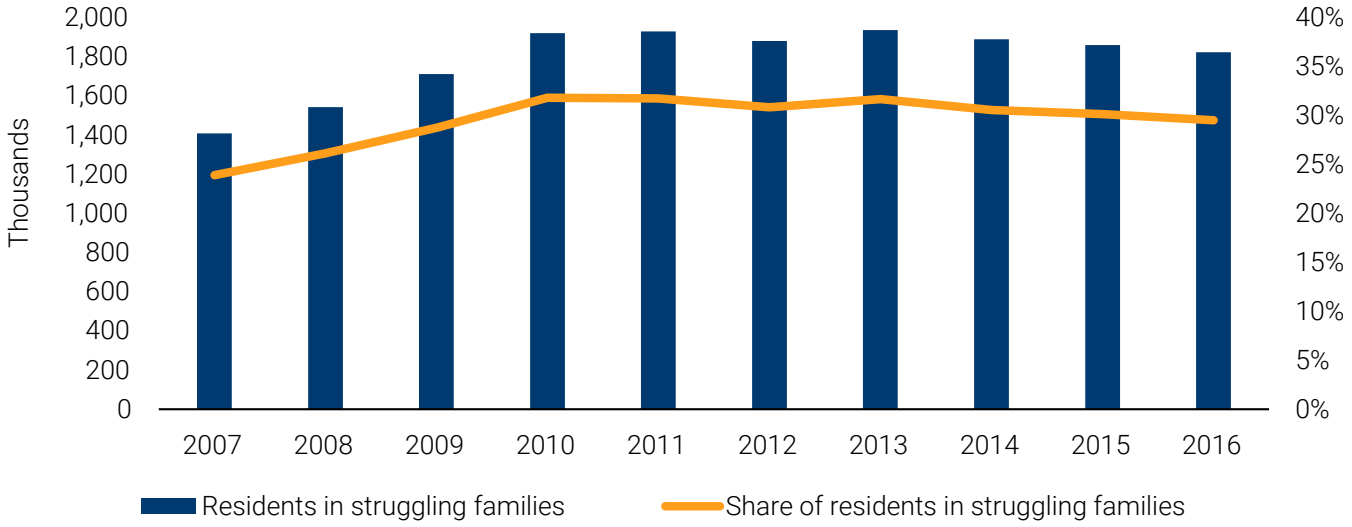
Real median hourly wage (1990 = 100), 1990 - 2019



Source: Brookings analysis of BEA and the Economic Policy Institute's State of Working America Data Library data.

Figure 9. Since 2010, about 30% of the state's population has been living in a struggling family

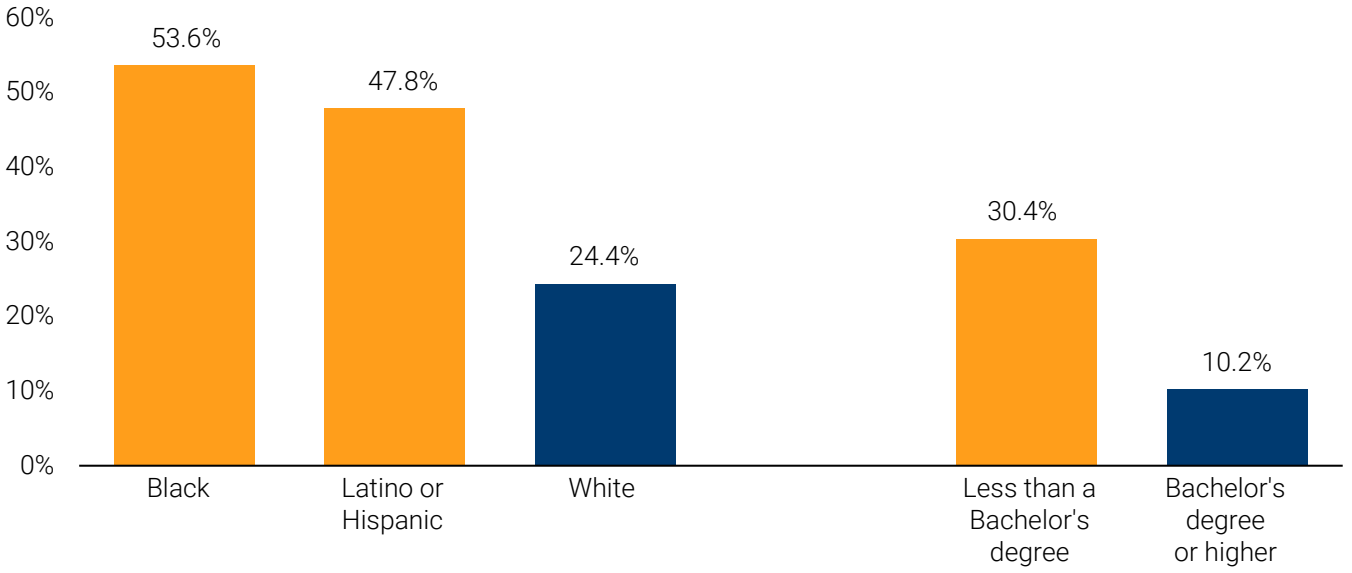
Number and share of struggling residents in Indiana, 2007 - 2016



Source: Brookings analysis of IPUMS USA data.

Figure 10. Indiana's Black, Latino or Hispanic, and noncollege populations were more than twice as likely as the white population to live in a struggling family

Share of Indiana residents who are struggling by group, 2016



Note: Asian Americans, Native Americans, Native Hawaiians, and people who identify as two or more races are not included because small sample sizes from IPUMS data prevent statistically significant estimates.

Source: Brookings analysis of IPUMS USA data.

Wages fell sharply during the Great Recession and only recovered their 2001-to-2007 average in the last five years. In short, Indiana's 0.5% per year real median wage growth over the 2000-to-2019 period trailed both the nation and peer states, ranking 46th among all states.

In short, Indiana had already experienced a significant loss of vibrancy and resilience in the decades before the pandemic crisis. This means that in addition to overcoming the current recession, the state needs to address a set of longer-term preexisting issues epitomized by its stagnant wage growth in recent years.

The human costs of such stagnation are especially concerning. On this front, the accumulated social impacts from the last cycle of recession and recovery suggest that COVID-19 crisis's dislocations will cast even more Indiana families into financially precarious positions.

With the onset of the Great Recession, for example, the number of Hoosiers living in families that struggled to make ends meet—as indicated by a well-regarded "self-sufficiency standard"—rose by over half a million people, from 1.4 million in 2007 to 1.93 million in 2011.[3]

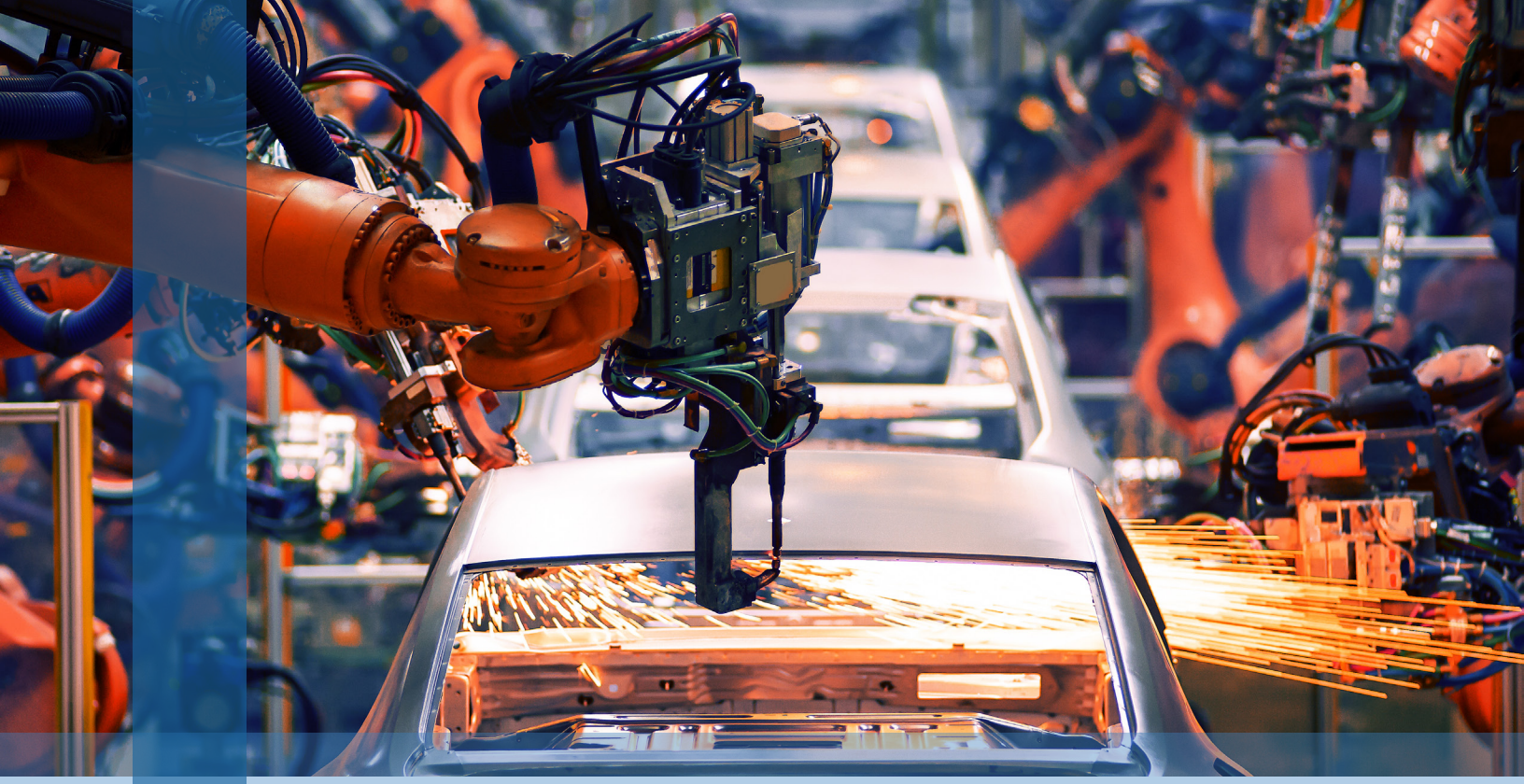
By 2016, that total had fallen only slightly to 1.82 million—a figure still nearly 400,000 higher than before the recession. Altogether, about 30% of the state's population has been living in a struggling family since 2010, with only small declines in recent years.

Indiana's less-educated workers and racial and ethnic minorities are especially overrepresented among the likely now-swollen ranks of the struggling. In 2016, the share of Hoosiers without a bachelor's degree in a struggling family was more than three times what it was for those with a college education. In the same year, Black and Latino or Hispanic residents were twice as likely as white residents to reside in a struggling family.

Now, the COVID-19 recession is likely to expand the state's pool of struggling families. For example, a surge of destitution equal to that which occurred between 2007 and 2010 would add another 700,000 Hoosiers to the ranks of the struggling in the next three years, pushing the total number up to 2.5 million residents—roughly 35% of the state population. And the fallout could be even worse than that; the pandemic's initial dislocations were much larger than those of the 2007 crisis.

The upshot is clear: As Indiana seeks to promote recovery after the COVID-19 recession, it does so having already lost ground over the last two boom-and-bust cycles across several topline indicators of economic resilience. Hoosiers should therefore do everything they can to leverage the coming recovery not just to recoup the job losses of 2020, but also to address the state's preexisting conditions and ameliorate its longer-term weaknesses.

The upshot is clear: As Indiana seeks to promote recovery after the COVID-19 recession, it does so having already lost ground over the last two boom-and-bust cycles across several topline indicators of economic resilience.



3 TRACKING INDIANA'S **ECONOMIC ISSUES**

To improve its economy as it recovers from the pandemic recession, Indiana needs to focus on getting the basics right when it comes to a number of fundamental drivers. In this vein, work at Brookings and elsewhere has explored the special importance of a short list of critical economic factors, whether in good times or bad.

These factors include the central importance of vibrant, high-value "advanced" industries; the ability of the economy to "reallocate" jobs and workers from troubled areas to promising ones; and the importance of inclusive growth that is broadly shared by all people and places.[4] Such factors represent not just critical takeaways from literature on resilience, but the true sources of Indiana's potential longer-run vitality—or lack thereof.[5]

Indiana faces challenges on several of these key economic factors. Most notably:

- Indiana has experienced weak recent growth because its most valuable advanced industries have been losing competitiveness.
- Indiana has struggled to adapt to recent economic changes, which has created transition challenges for industries and workers.
- Indiana is creating too few good jobs.

ECONOMIC ISSUE #1: INDIANA'S ADVANCED INDUSTRIES ARE ADRIFT

The first critical growth factor for Indiana is the state's enviable portfolio of advanced industries, an important source of the innovation and productivity that support quality employment and good pay.

The problem, however, is that the sector—and with it, the rest of the economy—has been adrift in several respects long before the COVID-19 crisis, with serious ramifications for the vitality of the entire economy.

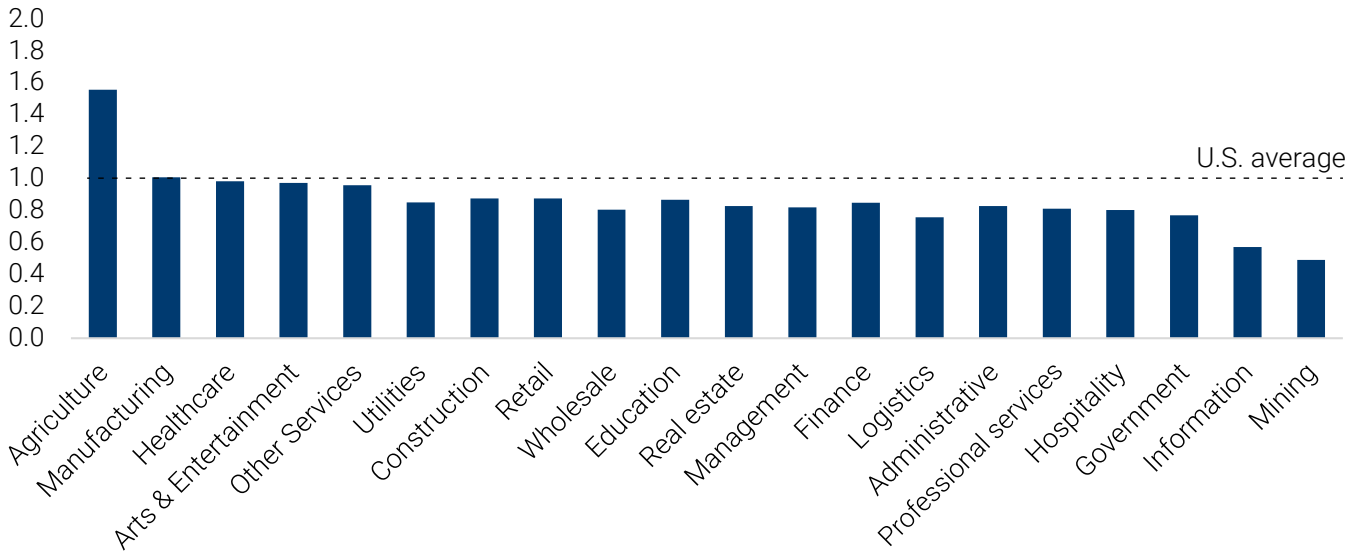
Indiana's productivity growth is slumping

"Productivity isn't everything, but in the long run it is almost everything," economist Paul Krugman wrote. And so it is for Indiana.

Economic theory identifies sustained improvement of productivity growth as a critical factor in state and regional prosperity. Productivity levels reflect how efficiently, on average, firms in a given sector (or across the whole economy) convert inputs into output. This transaction leads to profits for firms, which—if they are rising—can allow for increased wages.[6]

Industry productivity, in this sense, entails much more than the quality of human work. The results of labor in a firm are heavily determined by a myriad of other factors, including the firm's technology, management, and processes; the availability of public goods it can draw on (such as roads and airports); and the local policy environment.[7] Productivity gains are, therefore, a good indicator of an economy's ability to use technology, skills, and multiple other inputs to support higher value-

Figure 11. Most Indiana industries operate at lower productivity levels than their national counterparts
Productivity in Indiana relative to the US by industry sector, 2019



Source: Brookings analysis of BEA and Emsi data.

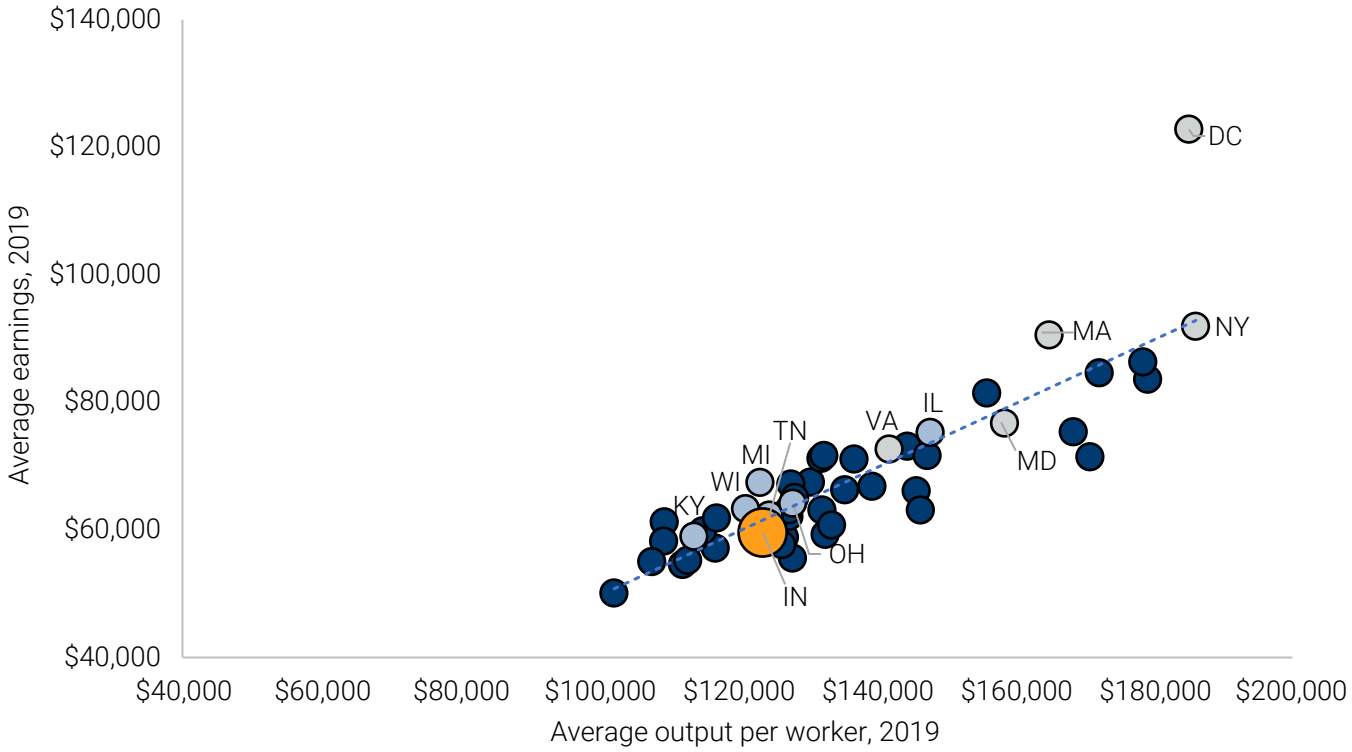
added economic activities, and potentially to increase not just wealth, but worker dignity and wages as well.[8] With that said, Indiana's productivity rates vary across the state's industries and have been slipping in a number of sectors. For example, while Indiana's economy-wide productivity has remained steadily around 15% below the nation's (par for its peers), the 2019 deficit was -43% in the information sector—which includes print media, software publishing, broadcasting, and telecommunications industries—and -20% in the hospitality sector.

One important exception to this general lack of competitiveness—until recently—has been manufacturing. Manufacturing productivity in Indiana has historically exceeded the national average since 2007; by 2015, however, its edge had fallen to less than 3% from a high of 16% in 2010. While the state's manufacturing productivity growth accelerated in 2010 and 2011 in the wake of the Great Recession, such gains have significantly slowed, leading to a convergence with the rest of the nation.

The state's productivity slump matters for workers because productivity levels are an important influence on wage levels. Firms with high and rising labor productivity are able to raise average compensation levels for their employees without also raising prices. And while productivity growth and average pay have been less tightly linked nationally in recent years, Figure 12 shows that across states, the link persists.

For the good of its workers, therefore, Indiana needs to generate more output, and do so more efficiently. Such vitality will also be essential for safeguarding the state's broader social and demographic vibrancy at a time of slowing population growth, as notes AEI adjunct fellow Lyman Stone in a report on the state's demographic future prepared for this project.[9]

Figure 12. The higher a state's productivity level, the higher its workers' average earnings
Average earnings by state, 2019



Source: Brookings analysis of BEA and Emsi data.

Indiana's advanced industries are the key to productivity

Indiana's advanced-industry sector—with its higher productivity rates—lies at the heart of the state's economy. As defined by Brookings, the advanced-industry sector consists of 47 R&D- and STEM-intensive industries (46 of which operate in Indiana with meaningful employment), ranging from biopharma manufacturing and medical devices to auto parts, R&D consulting, and tech. These industries represent the leading edge of Indiana's economy.

Defining Indiana's advanced industries

Advanced industries were identified for this report using two criteria:

- R&D spending per worker must fall in the 80th percentile of industries or higher, exceeding $3,200 per worker.
- The share of jobs in the industry requiring a high degree of STEM knowledge must exceed the national average of 20%.

In Indiana 46 industries meet this threshold, including 35 manufacturing, two energy, and nine service industries. The majority of them are advanced manufacturing industries such as pharmaceuticals, motor vehicles, and medical equipment; a smaller number are critical service activities such as computer systems design, R&D services, and telecommunications. Indiana's energy industries are so small that they are set aside.

As a group, America's (and Indiana's) advanced industries—characterized by their heavy use of technology and technical workers—share a strong orientation to engineering solutions and digital processes, and so constitute Indiana's prime technology-adoption sector. As a result, the super-sector encompasses many of Indiana's most important industries. Even more, the sector represents Indiana's core engine of the productivity growth that in large part determines the state's competitive position and standard of living.

As to the sector's larger value, advanced industries operate in all 92 Indiana counties, and are making critical contributions to the well-being of the state, the nation, and the world. Wherever they operate, advanced industries generate quality jobs with wage premia for workers of all education levels. What's more, these industries support long supply chains and radiate important regional economic activity.

And Indiana's advanced industries are making the world better. In the Bloomington area, Catalent has played a key role in maintaining the pharmaceutical supply chain during the pandemic, and is currently manufacturing the COVID-19 vaccine developed by Moderna.

In auto parts manufacturing, Cummins has been a mainstay for over a century from their headquarters in Columbus. Along with sustaining continual reductions in diesel engine emissions, the firm produces low-emission, heavy-duty gas compression engines on the cutting edge of global demand. Generations of Hoosiers have earned excellent wages producing engines and components, and their skills will be necessary to support global demand for new engine technology.

In the advanced services, firms such as Solinftec exemplify the continual application of advanced digital technology in so-called "low-tech" industries. Solinftec provides data analytics and artificial intelligence services to agricultural and retail operations around the globe.

In short, advanced industries are vital to both the world and Indiana. These industries anchor the traded sector. They are the leaders in U.S. innovation and good-paying employment. And they represent the focal point of Indiana tech use and productivity. Focusing on the sector creates a clear view of the industries that matter most in driving Indiana prosperity.

For a thorough review of the advanced-industry sector and its impact, see Mark Muro and others, "America's Advanced Industries: What They Are, Where They Are, and Why They Matter" (Washington: Brookings Institution, 2015).

Table 1. Indiana's advanced industries: By the numbers

The Indiana advanced-industry sector is composed of 46 individual R&D- and STEM-intensive industries

Industry title	National definitional criteria		Indiana summary statistics	
	R&D spending per worker	Share of high STEM knowledge Occupations	Employment, 2019	Output (millions), 2019
MANUFACTURING				
Textile and Fabric Finishing and Fabric Coating Mills	$3,200	42%	200	$218
Petroleum and Coal Products Manufacturing	$7,500	43%	3,700	$5,534
Basic Chemical	$19,100	56%	3,300	$2,449
Resin, Synthetic Rubber, Fibers and Filaments	$10,000	56%	2,200	$1,480
Pesticide, Fertilizer, and Agricultural Chemical	$53,400	56%	1,000	$693
Pharmaceutical and Medicine	$219,700	47%	18,100	$16,018
Paint, Coating, and Adhesive	$11,500	39%	1,700	$506
Soap, Cleaning, and Toilet Preparation	$24,100	39%	2,300	$1,350
Other Chemical Product and Preparation	$11,500	56%	2,500	$784
Plastics Product	$4,900	21%	34,900	$3,085
Rubber Product	$4,900	21%	5,400	$473
Agr., Construction, and Mining Machinery	$17,000	32%	2,600	$378
Industrial Machinery	$38,400	32%	2,400	$280
Commercial and Service Industry Machinery	$24,500	31%	1,800	$179
HVAC and Commercial Refrigeration	$3,700	32%	5,100	$756
Metalworking Machinery	$3,700	52%	7,100	$598
Engine, Turbine, and Power Transmission	$24,300	44%	13,400	$2,933
Other General Purpose Machinery	$3,700	32%	12,700	$1,731
Computer and Peripheral Equipment	$102,200	60%	300	$15
Communications Equipment	$138,400	45%	1,800	$564
Audio and Video Equipment	$49,800	39%	100	$5
Semiconductor and Other Electronic Component	$86,000	42%	4,100	$481
Navigational, Measuring, and Control Instruments	$40,500	46%	6,300	$1,150
Manuf. Magnetic and Optical Media	$102,200	22%	400	$31
Electric Lighting Equipment	$12,700	21%	3,000	$323
Electrical Equipment	$12,700	34%	2,800	$307
Other Electrical Equipment and Component	$12,700	25%	2,800	$364
Motor Vehicle	$70,100	22%	18,500	$11,455
Motor Vehicle Parts	$11,400	28%	65,300	$7,793
Aerospace Product and Parts	$42,400	53%	6,300	$1,928
Railroad Rolling Stock	$7,200	26%	900	$139
Ship and Boat Building	$4,300	34%	3,400	$339

Other Transportation Equipment Manufacturing	$31,200	27%	500	$150
Medical Equipment and Supplies Manufacturing	$38,200	37%	20,400	$3,540
Other Miscellaneous Manufacturing	$9,200	20%	10,300	$908
ENERGY				
Oil and Gas Extraction	$5,000	43%	100	$28
Support Activities for Mining	$6,000	36%	400	$50
SERVICES				
Software Publishers	$75,700	62%	1,800	$822
Wired and Wireless Telecommunications Carriers	$3,600	48%	8,000	$3,679
Satellite Telecommunications	$89,200	48%	200	$19
Other Telecommunications	$5,700	48%	900	$132
Data Processing, Hosting, and Related Services	$20,400	49%	2,200	$510
Other Information Services	$91,600	42%	1,700	$362
Computer Systems Design and Related Services	$7,300	66%	24,400	$3,819
Scientific Research and Development Services	$21,400	59%	3,600	$10,523
Medical and Diagnostic Laboratories	$4,800	43%	6,000	$755
Advanced Manufacturing			268,400	$75,842
Advanced Energy Industries			500	$78
Advanced Services			54,600	$20,621
All Advanced Industries			323,600	$96,540

Source: Brookings analysis of BEA, Emsi, Moody's Analytics, and National Science Foundation data.

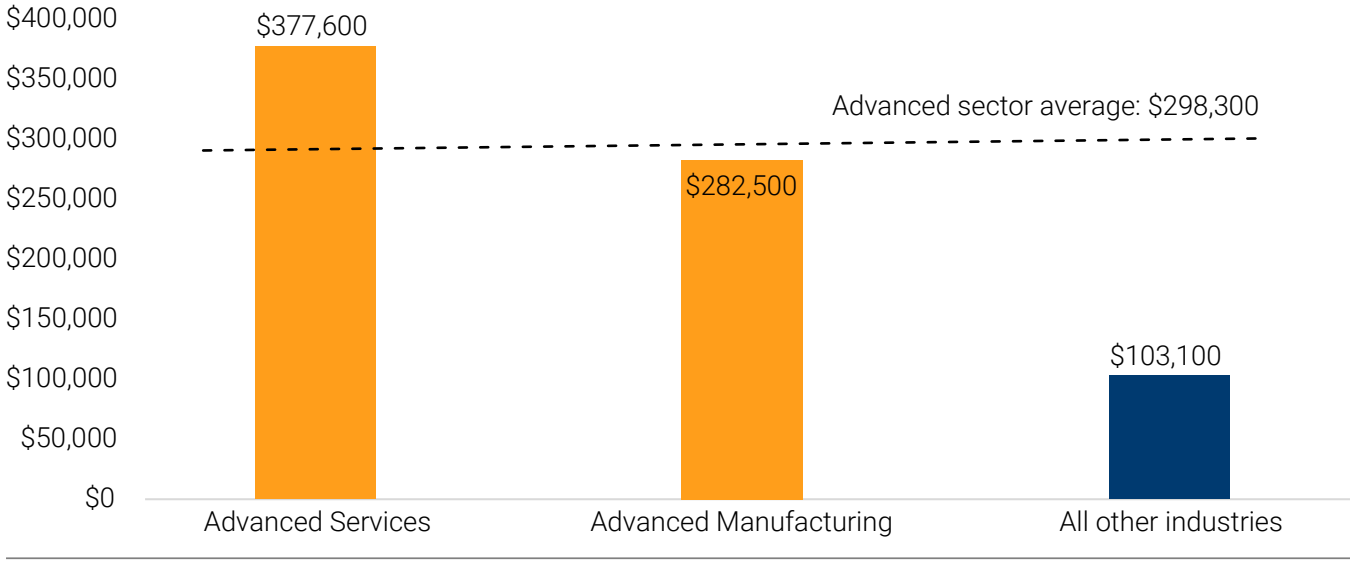
In aggregate, the advanced-industry sector produced 25% of the state's output in 2019 and 63% of its exports in 2017, with 59% of those exports coming from advanced manufacturing industries.

In addition, the sector comprised 10.5% of statewide employment in 2019—or 323,600 workers, with 268,400 in advanced manufacturing and 54,600 in advanced services—giving Indiana the third-highest sector share in the nation, behind only Michigan and Washington.[10] For comparison, only 8.1% of employment in the U.S. as a whole and 9% of employment in Indiana's peer states lies in advanced industries.

Employment shares, however, actually understate the importance of the advanced-industry sector in Indiana. Present in every Indiana county, the sector is above all else distinguished by its high productivity and good pay. Whereas average annual output per worker across non-advanced industries in Indiana stood at $103,100 in 2019, the figure was $298,300 per worker in the state's advanced industries—nearly triple that of the rest of the economy on average.

As a result, advanced industries anchor the state's prosperity because they pay considerably higher wages than most other sectors of the Indiana economy. Average annual earnings were $92,000 in Indiana's advanced-industry sector in 2019—more than 1.5 times the statewide average earnings across all industries ($59,600). In some parts of the sector, average pay even reaches into the six figures. For instance, those employed in pharmaceutical and medicine manufacturing—which includes a collection of high-wage jobs in R&D and engineering—make $202,000 a year on average. More broadly, average annual earnings register at $89,700 in advanced manufacturing and $103,200 in advanced services industries.

Figure 13. Advanced industries' productivity is nearly triple that of the rest of the Indiana economy
Productivity by subsector in Indiana, 2019

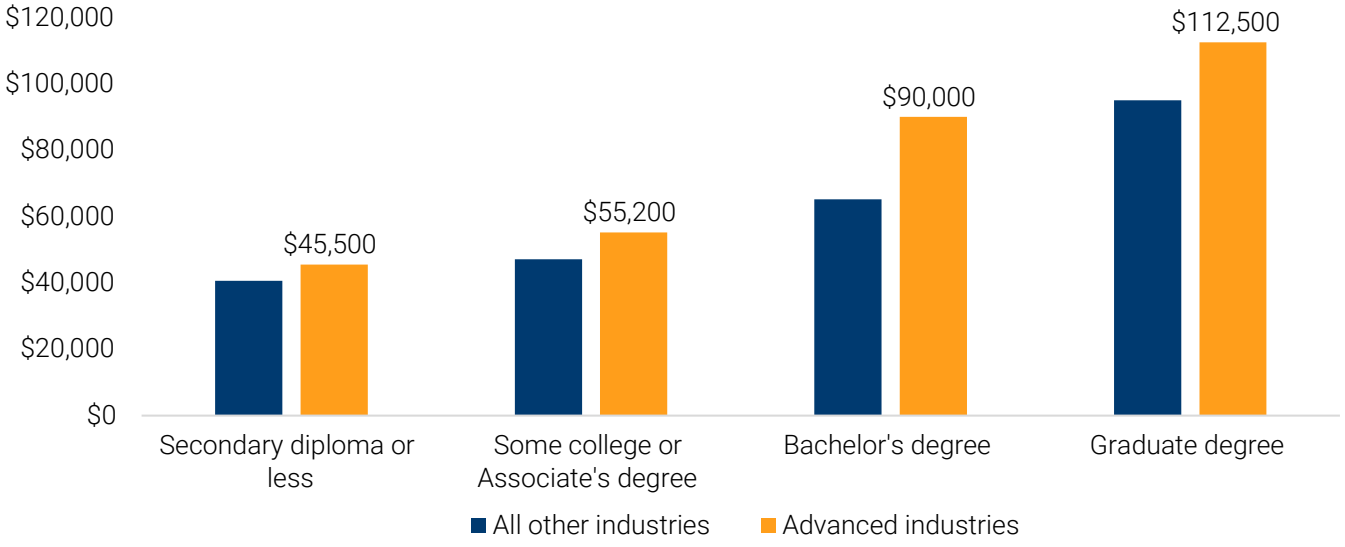


Source: Brookings analysis of BEA and Emsi data.

The benefits of the advanced-industry sector don't only accrue to those who are employed in them. Rather, the sector's positive economic impacts radiate widely. It brings good-paying jobs to each of Indiana's 92 counties, including RV production in Northern Indiana, orthopedics equipment manufacturing in Northeast Indiana, and plastics in the Southwest. In addition, Brookings estimates that the advanced-industry sector creates an additional 23 "indirect" jobs for every 10 directly created.

Figure 14. Workers of every educational background see a significant wage premium for working in Indiana's advanced-industry sector

Average wage in Indiana by education, 2018



Source: Brookings analysis of IPUMS USA and Emsi data.

Figure 14 shows that these high average wages benefit workers up and down the skill ladder. To be sure, average compensation in Indiana and elsewhere has diverged from average labor productivity in much of the economy, for a variety of reasons detailed later in this report. However, the fact remains that broad productivity is a prerequisite for wage gains for the typical worker—even if ensuring that pay actually rises for most workers depends on the presence of favorable management and policy.[11]

Along these lines, Indiana workers of every educational background enjoy a significant wage premium for working in the advanced-industry sector—one that increases with the amount of education a worker has. Workers with a high school diploma or less, for instance, receive a 12% boost in annual wages for working the sector, while bachelor's degree holders enjoy annual wages 38% higher than what they would receive working elsewhere.

The benefits of the advanced-industry sector don't only accrue to those who are employed in them. Rather, the sector's positive economic impacts radiate widely. It brings good-paying jobs to each of Indiana's 92 counties, including RV production in **Northern Indiana**, orthopedics equipment manufacturing in **Northeast Indiana**, and plastics in the **Southwest**. In addition, Brookings estimates that the advanced-industry sector creates an additional 23 "indirect" jobs for every 10 directly created: seven in locally serving industries such as retail, education, and health care that benefit from the high wages paid to workers in the advanced sector, and 16 in traded industries such as industrial machinery manufacturing and long-distance trucking that supply advanced-industry sector activity.[12] This means that the 323,600 jobs in Indiana's advanced industries sustain another 500,000 positions in the state, as well as another 200,000 across the region and nation.

How advanced industries' economic impacts radiate

High and rising standards of living are generated largely in two ways: through trade and through economic growth. Advanced industries lie at the center of both. Advanced industries anchor the traded sector, which, by earning money from other locations, serves as the primary generator of wealth for cities, regions, and nations. Furthermore, trade encourages specialization, which increases productivity. The potential to export also encourages investment by promising increased sales, economies of scale, and, therefore, profits. Advanced industries encompass the competitive heart of the U.S. traded sector—and for that reason, they pay well.

Yet the advanced-industry sector's role in the economy extends well beyond trade. Advanced industries support large numbers of indirect jobs (a "multiplier effect") and generate the technologies that enhance productivity and increase economic growth. The sector's substantial multiplier effect on jobs explains why it plays such an outsized role in U.S. employment. As income earned by advanced industries is paid out to employees, suppliers, and service providers, money radiates out to the broader economy, supporting more jobs. The nontraded sector of the economy—where most people work—depends heavily on income from the traded sector.

And advanced industries' impacts radiate even further. As economists Philippe Aghion and Peter Howitt state, "In order to sustain a positive growth rate in output per capita in the long run, there must be continual advances in technological knowledge." Advanced industries represent the prime site of that technological knowledge in the economy. New knowledge and technology, in turn, enable the economy to increase the value of output from a fixed quantity of inputs. In other

words, innovation and technology power productivity growth economy-wide, which is the only durable means by which a society's living standards can rise.

In sum, advanced industries are the nation's crown jewels, priming the economy with income, knowledge, and technology. In doing so, they generate employment, value, and progress across the entire economy.

Sources: Robert Solow, "A Contribution to the Theory of Economic Growth," Quarterly Journal of Economics, 70(1) (1956); Philippe Aghion and Peter Howitt, Endogenous Economic Growth Theory (Cambridge, MA: MIT Press, 1997), p. 11; Douglass North, "Location Theory and Regional Economic Growth," Journal of Political Economy, 63(3) (1955); Paul Romer, "Endogenous Technological Change," Journal of Political Economy, 98(5) (1990); Paul Krugman, The Age of Diminished Expectations (Cambridge, MA: MIT Press, 1994).

The benefits of these job multipliers in Indiana are also widely distributed across the state (see Map 3). In fact, advanced industries operate in significant numbers throughout the state, representing between 5.3% of total employment in **Northwest Indiana** and 22.8% of employment in the **Southeast**, with each region exhibiting its own industrial specializations. Nineteen percent of all advanced manufacturing employment in Indiana is sited in the **Northeast** due to large motor vehicle parts and medical equipment manufacturing complexes. More than half of all advanced services jobs, though, are clustered in **Central Indiana**, with computer systems design services alone employing over 15,000 workers in the region. In sum, the size, pay, and breadth of the advanced-industry sector across all parts of the state underscore its crucial place in supporting a robust economy and balanced growth.

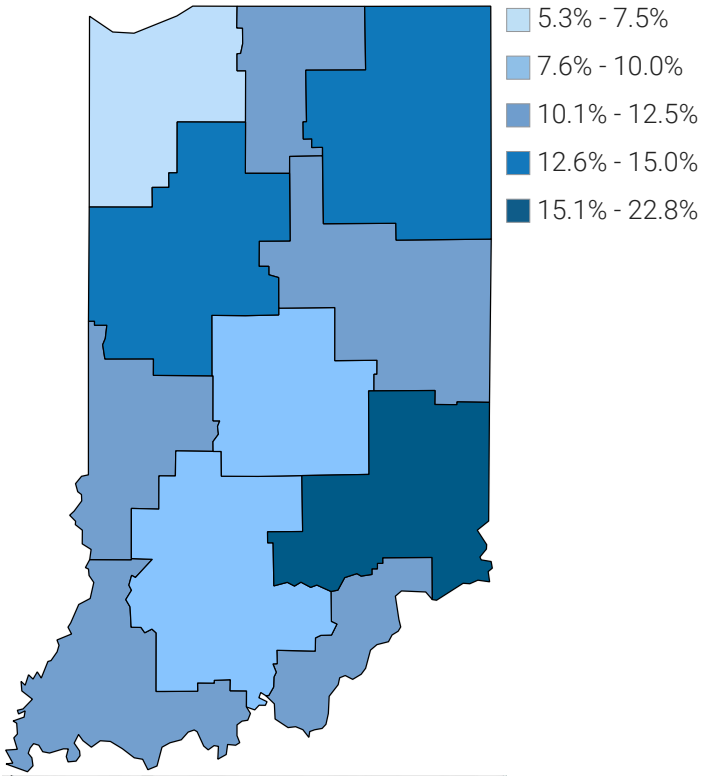
The advanced-industry sector has been adrift long before the current recession

Recent growth and productivity trends, however, raise serious concerns about the ability of the advanced-industry sector to continue to lift Indiana's pay levels and quality of life as it has in recent years.

To begin with, the Great Recession of 2007 to 2009 damaged the sector by erasing tens of thousands of Indiana's advanced industries jobs and billions of dollars of output. While employment in the sector contracted 8.2% nationally between 2007 and 2009, in Indiana, the contraction was nearly twice as large. Fully 16% of Indiana advanced industries jobs were lost in a recession that hit manufacturing early and hard.

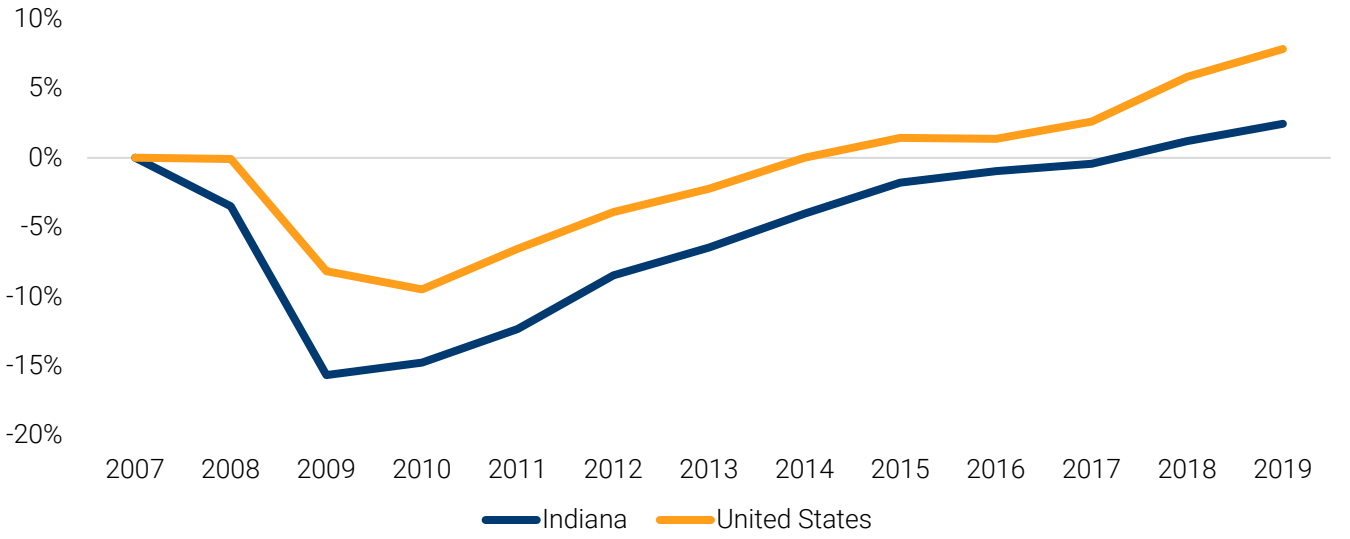
Map 3. Advanced industries support quality employment—albeit at different concentrations—in all Indiana counties and in every region

Employment share in advanced industries by region, 2019



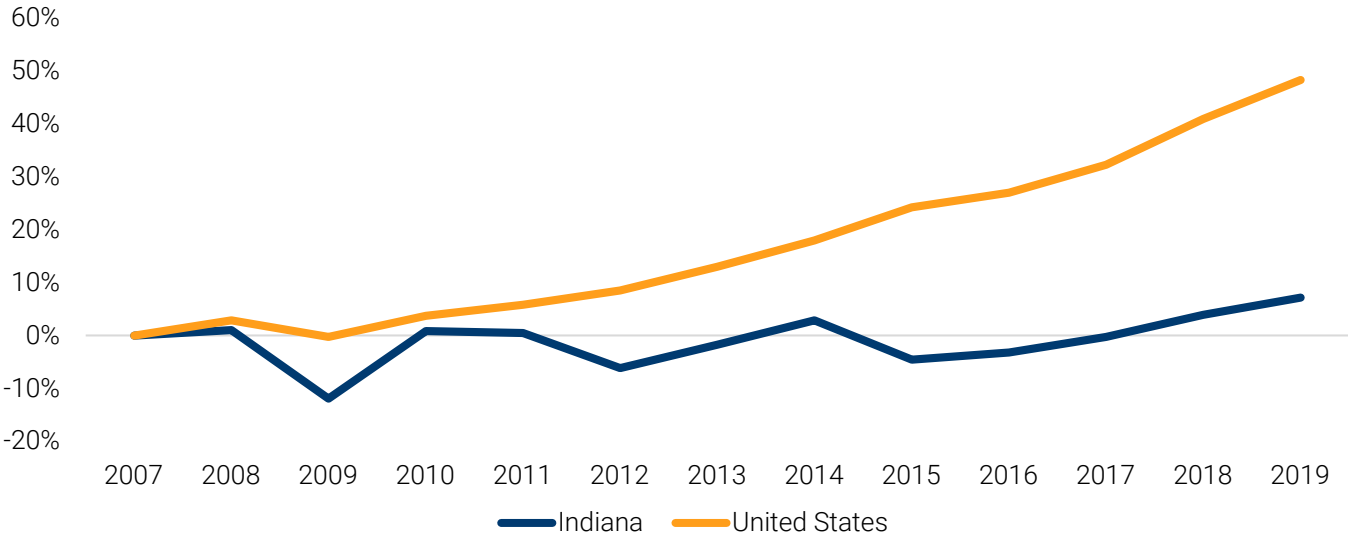
Source: Brookings analysis of Emsi data.

Figure 15. Indiana's advanced industries employment growth has trailed the nation's since the Great Recession
Advanced industries employment - Percent change since 2007, 2007 - 2019



Source: Brookings analysis of Emsi data.

Figure 16. Indiana's advanced industries output growth has also trailed the nation's
Real advanced industries output - Percent change since 2007, 2007 - 2019



Source: Brookings analysis of BEA and Emsi data.

Subsequently, job growth in Indiana paralleled the sector's nationwide growth, though the severity of the Indiana downturn meant it took the state longer than elsewhere to fully recoup all the jobs it had lost.[13]

Meanwhile, output in the sector has had a sideways trajectory, effectively failing to grow between 2007 and 2019. This stagnation is especially troubling in light of the fact that, nationally, advanced-industry sector real output had grown 48% by 2019.

This stagnant output amid a period of employment recovery is a function of the sector's decade-long productivity slide. Between 2007 and 2019, Indiana's advanced industries productivity grew at a paltry 0.4% annually, from $285,100 to $298,300 per worker. By comparison, real output per worker in advanced industries nationally grew 2.7% a year during this period, reaching $375,000 per worker in 2019—implying a productivity gap of nearly 20% between the state and the nation. This represents a fall from the state's slight productivity *advantage* in the sector of 5% in 2007.

What caused this relative decline? A closer look at industry composition suggests that the relative size and productivity of the sector's constituent subsectors explain a lot. For one thing, the state's sizable advanced manufacturing industries—second only to Michigan's as a share of the state workforce, at 8.7%—dominate the Indiana's overall advanced-industry sector, but have actually been losing productivity.

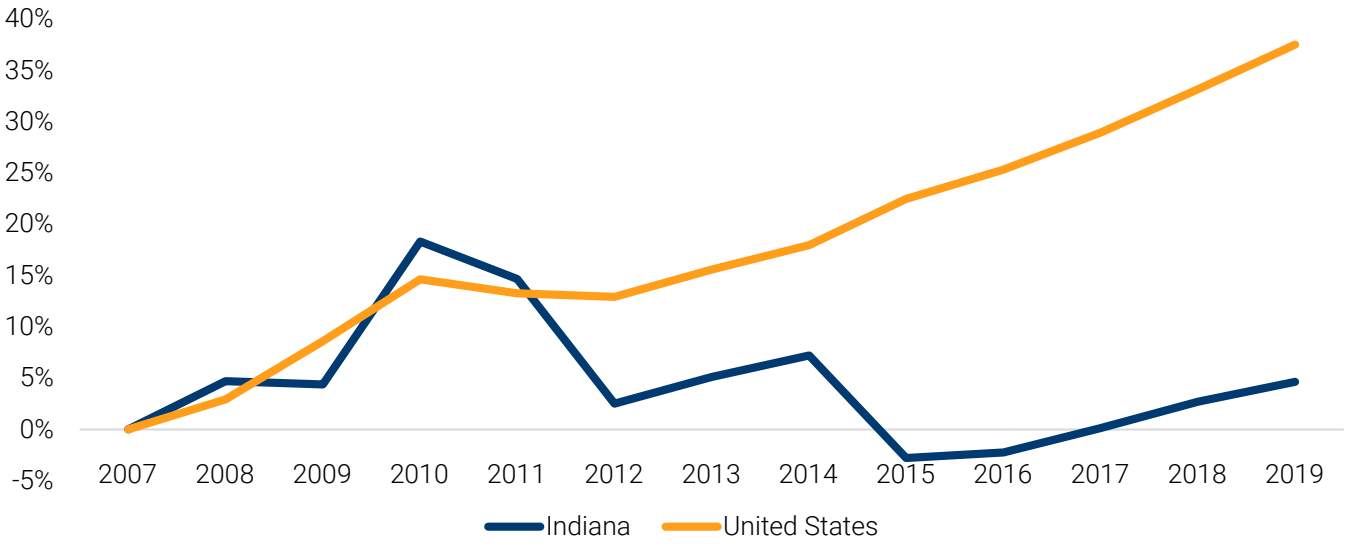
Table 2 shows this: Between 2007 and 2019, average real output per worker across Indiana's advanced manufacturing industries fell at an annual rate of -0.1%, even as the national sector increased its productivity at a 2.2% clip.

To be sure, some large advanced-manufacturing industries in Indiana—including pharmaceuticals, motor vehicles and parts, and engine manufacturing—maintained their productivity edge. But besides those, numerous Indiana advanced-manufacturing industries—ranging from agricultural chemicals and medical equipment to paint, coating, and adhesive manufacturing—all lost competitiveness as their productivity fell by more than 2% a year.

At the same time, Indiana's advanced services subsector has been modestly increasing its significantly higher productivity, but it remains small—which is a problem because scale frequently brings efficiency. In terms of

Figure 17. Indiana's advanced industries productivity growth has fallen behind the nation's since 2010

Advanced industries productivity - Percent change since 2007, 2007-2019



Source: Brookings analysis of Emsi and BEA data.

Table 2. Indiana's advanced industries are limited by their lower productivity levels and growth rates, as well as their concentration in manufacturing rather than services

	Indiana		United States	
	Productivity, 2019	Productivity CAGR, 2007-19	Productivity, 2019	Productivity CAGR, 2007-19
Advanced industries	$298,300	0.4%	$375,000	2.7%
Advanced manufacturing	$282,500	-0.1%	$288,700	2.2%
Advanced services	$377,600	1.8%	$473,200	2.6%

Note: Productivity is defined as output per worker.
Source: Brookings analysis of Emsi and BEA data.

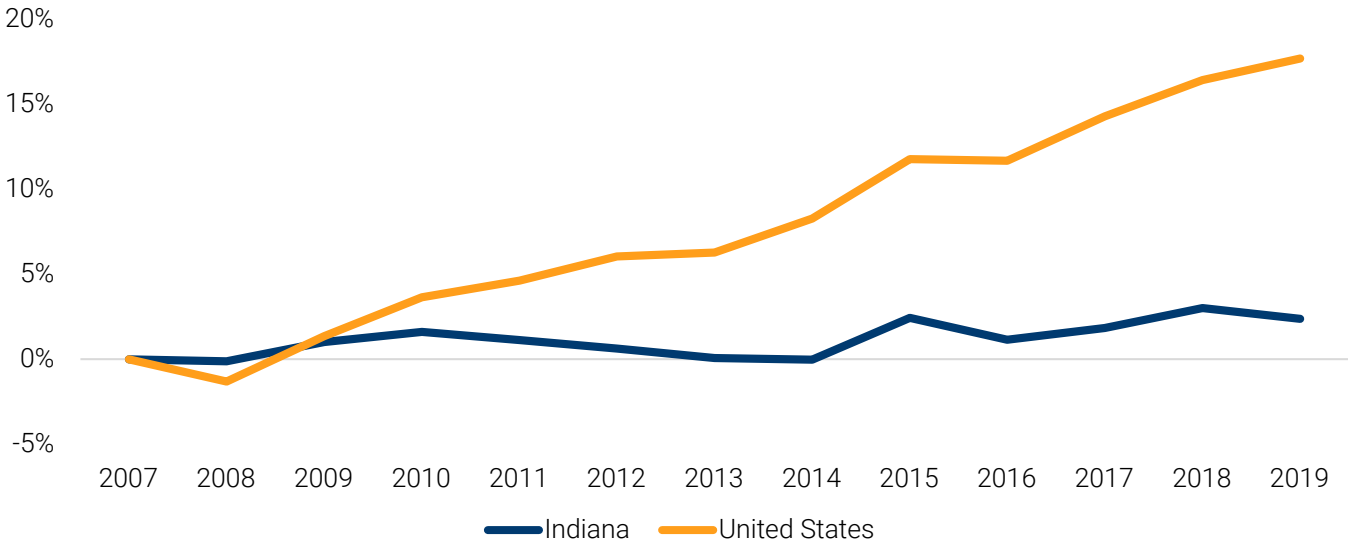
productivity, Indiana's advanced-services subsector—anchored by fields such as software and scientific research—has been gaining momentum. Table 2 shows the advanced-services subsector bested the productivity of the state's advanced-manufacturing subsector in 2019 by $95,000 and has increased its average real output per worker by 1.8% per year over the last 12 years. So, the advanced-services subsector has gained efficiency while the advanced-manufacturing subsector has been losing it.

With that said, few states have as underdeveloped an advanced-services sector (as a share of state aggregate advanced-industry activity) as Indiana. Just 21% of Indiana's advanced-industry sector output and 17% of its advanced-industry sector employment resides in advanced services, the faster-growing and more dynamic portion of the overall sector. Nationally, those shares are 53% and 42%. Altogether, a mere 1.8% of Hoosiers are employed in advanced services, ranking Indiana 41st among all states by that measure.

All of which suggests two key points. First: Indiana has struggled across the board with relative—and, in the case of advanced-manufacturing industries, absolute—losses of advanced-industry sector competitiveness that will continue to inhibit the state's development. Second: The underdevelopment of Indiana's advanced-services subsector has meant that the state has largely missed out on the tremendous growth that these important digital and high-tech industries have seen since the last recession, as the U.S. advanced economy has moved away from goods production and toward skilled tradable services.[14]

As to the ramifications of these lags in competitive advantage, they are most glaringly visible in the stagnation of average earnings in Indiana's advanced-industry sector since 2007. Given that productivity trends shape pay trends, it is not surprising that wages in Indiana's best-paying swath of industries have also been stagnating in comparison to other states.

Figure 18. Drift in the advanced-industry sector's productivity has led to stagnant earnings growth
Advanced industries average earnings - Percent change since 2007, 2007 - 2019



Source: Brookings analysis of Emsi and BEA data.

Since 2007, pay in Indiana's manufacturing-heavy advanced-industry sector increased by just 2.4%, reaching $92,000 in 2019. Virtually all of this paltry increase was driven by wage gains in the small advanced-services subsector. Advanced manufacturing, on the other hand, saw virtually no increase in average pay relative to 2007.

Regional impact varies depending on industry mix

Much of the impact of these trends is tied to the advanced-industry sector's variegated distribution into all regions and their local industry mixes.

Southern Indiana, the **Wabash Heartland,** the **Indiana Uplands**, and **Southeast Indiana** all experienced robust, manufacturing-driven recoveries in the wake of the Great Recession that *increased* their stock of advanced-industries jobs at rates of over 1% a year. Populous **Central Indiana** also performed well given both a sizable advanced-manufacturing presence and the state's largest advanced-services concentration. Between 2007 and 2019, nearly 9,000 new Central Indiana jobs were created in computer systems design services alone—more than the combined net job loss seen in the region's advanced-manufacturing sector.

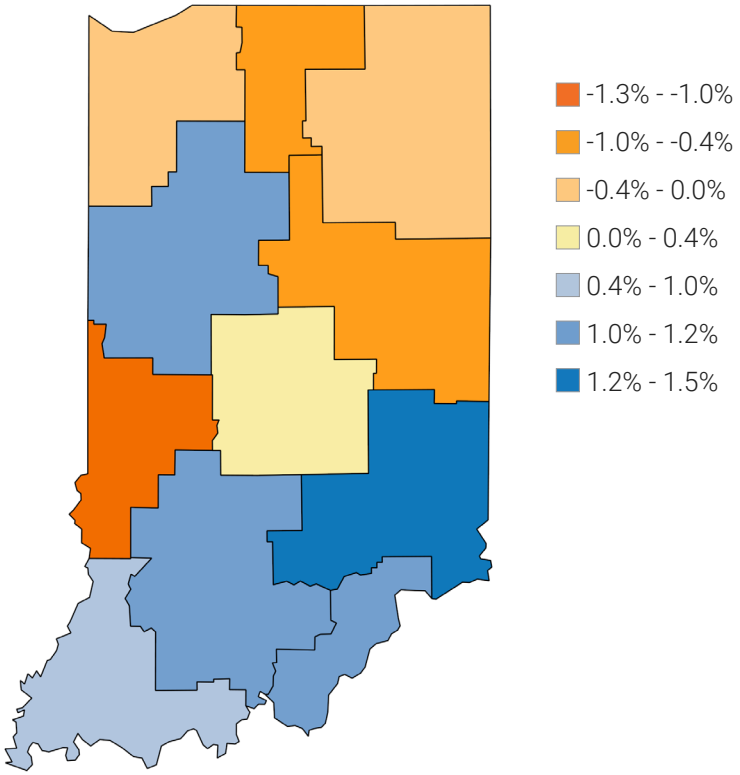
By contrast, five of the state's 11 regions—**Northwest**, **Northeast**, **Northern**, **West Central**, and **East Central** Indiana—still had fewer advanced-industries jobs in 2019 than they did in 2007.

Looking closer at the state map shows specific dynamics across advanced manufacturing and advanced services that drove these regionally variegated patterns. In the decade after the Great Recession, advanced-manufacturing trends drove advanced-industry sector job losses in all five of the regions whose sectors had not fully recovered from the downturn, with the bulk of job losses occurring in communications equipment, commercial machinery and HVAC equipment, and plastics manufacturing. Among the regions, **Northern Indiana** and its RV manufacturing cluster were hit especially hard in 2007. At the same time, all three of the state's southern regions owed their rapid recoveries to especially strong job growth in motor vehicles and parts, engines and turbines, and plastics production.

The result was a spatially divergent economic picture that left some regions particularly vulnerable to the COVID-19 downturn last spring.

Map 4. Advanced-industries employment changes varies across the state's regions during the last decade, with the southern half of the state adding jobs faster

Advanced industries employment by region - Percent change since 2007, 2007-2019



Source: Brookings analysis of data from Emsi.

The pandemic is creating new challenges

The COVID-19 pandemic and subsequent start-and-stop recovery have, meanwhile, stressed the advanced-industry sector with both a sharp demand shock and a lingering cloud of uncertainty.

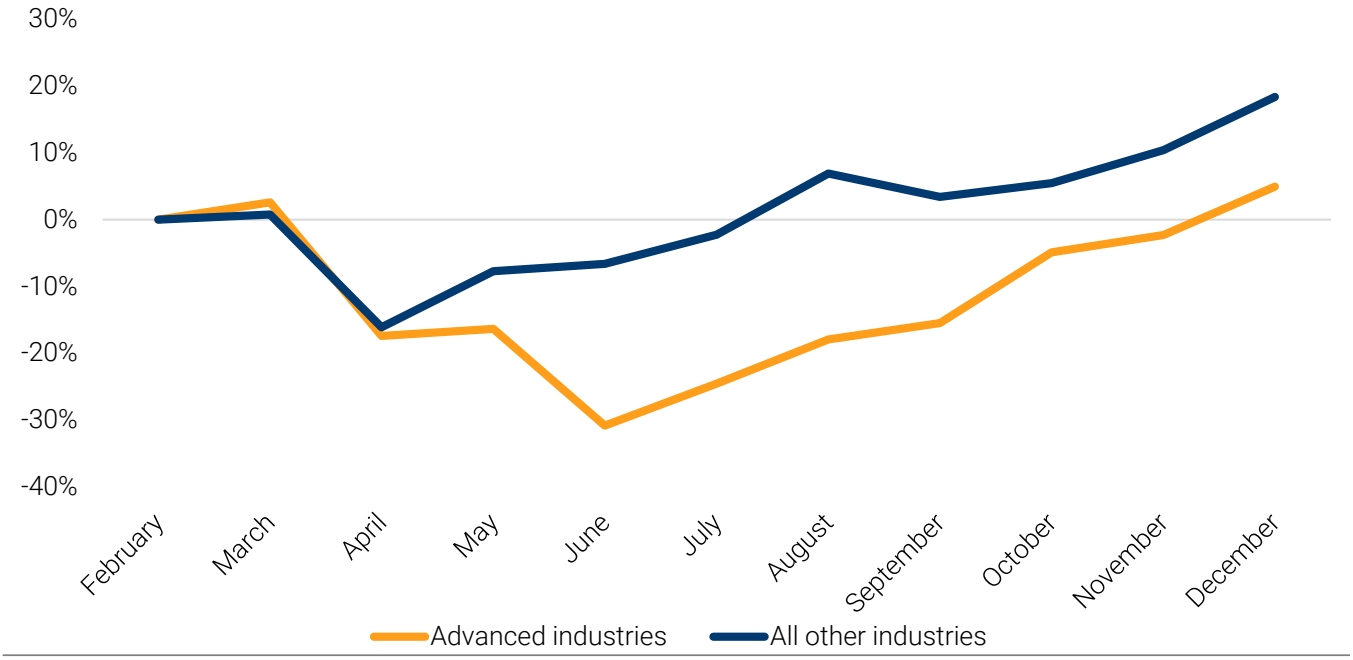
Segmented online job postings data—which approximates real-time labor demand and signals industry confidence levels—illuminate the year's challenges, in the absence of employment and output data for detailed local industries as of this writing.[15]

Overall, job postings trends depict a challenging (but improving) year for Indiana's advanced industries. In June, advanced-industry job postings had plunged 31% below February levels, and by November they still remained slightly (2%) below where they were a year earlier, after missing out on the usual summer growth of hiring notices. It wasn't until December that postings fully recovered to where they were before the crisis, reaching 5% above their February levels.

Tracked in aggregate, the pace of the sector's job postings recovery trailed that of the rest of the economy, likely reflecting the greater uncertainty of selling high-value export products and forecasting demand. Despite the relatively slow recovery, job postings in early winter signaled that advanced-industries firms were gradually regaining confidence about the future strength of the sector after 10 months of stress.

Figure 19. Indiana advanced-industry job postings have been slower to recover to pre-crisis levels than the rest of the economy

Job posting trends in advanced industries and the rest of the economy, Indiana, February - December 2020



Source: Brookings analysis of Emsi data.

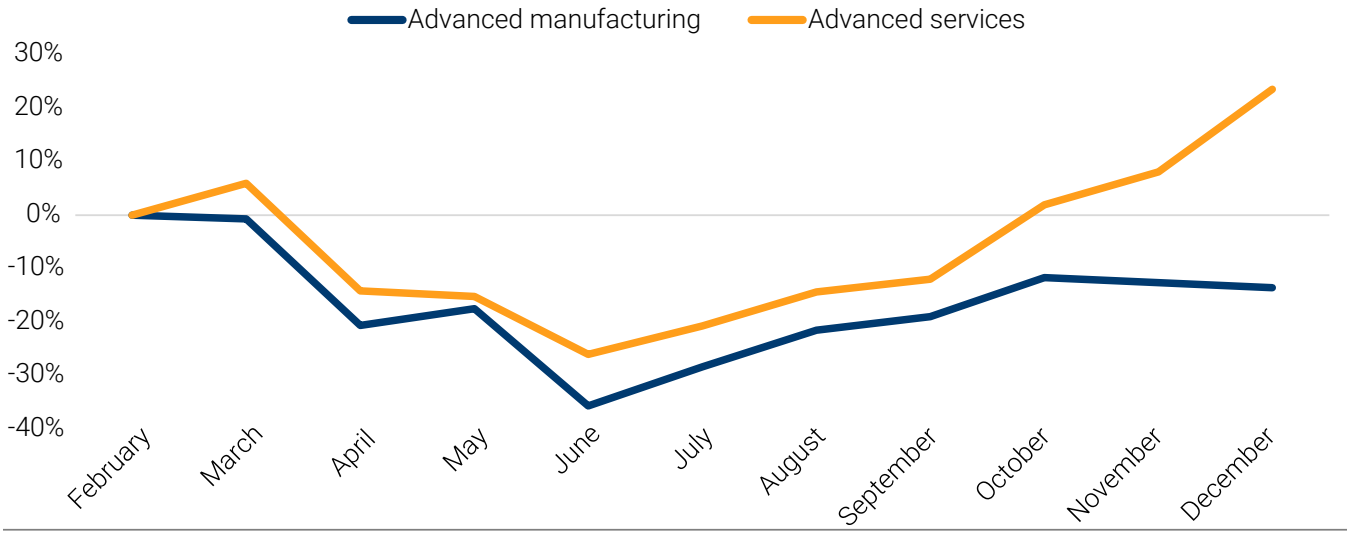
But while the sector has largely recovered its aggregate hiring activity, not all advanced industries have been equally affected by the recession. At the subsector level, the state's advanced-manufacturing industries have, on balance, been hit harder than its advanced-services ones and had yet to fully recover to February levels when it came to job postings. For each subsector, job postings bottomed out in June, with a 36% drop from February levels in advanced manufacturing compared to a 26% drop in advanced services. Advanced-services firms were evidently more able to hire even during the worst of the crisis, given the industry's high proportion of white-collar, "teleworkable" occupations. By contrast, some manufacturing facilities had to shut down entirely and reduce work levels to protect workers from contracting COVID-19.

Nor have all industries within each subsector had the same experience. In the advanced-manufacturing group, for example, job postings in the pharmaceutical and medicine manufacturing industries—supported by lucrative contracts to meet new pandemic-era medical needs—never slumped, and in December were 17% above their pre-pandemic levels. The auto sector, for its part, was hit hard in the spring but began to post more and more job announcements by midsummer, as demand for new cars and trucks returned. By October, job postings in motor vehicle manufacturing had made a full rebound from their summer lows and were up 18% over February (although November and December saw a dip in postings).

Other advanced-manufacturing industries were less lucky. While the pharmaceutical industry has done well throughout the pandemic, job postings in medical equipment and supplies manufacturing remain 26% below February levels. That may reflect depressed overall demand for elective procedures despite an increased need for pandemic-relevant goods such as personal protective equipment. Similarly, motor vehicle parts manufacturing have also experienced a slow recovery in job postings, indicating that firms have not expected to return to full capacity in the immediate future. Such trends suggest continued pandemic-related

Figure 20. Advanced-manufacturing industries have been slower to post jobs during the recovery than have advanced-services industries

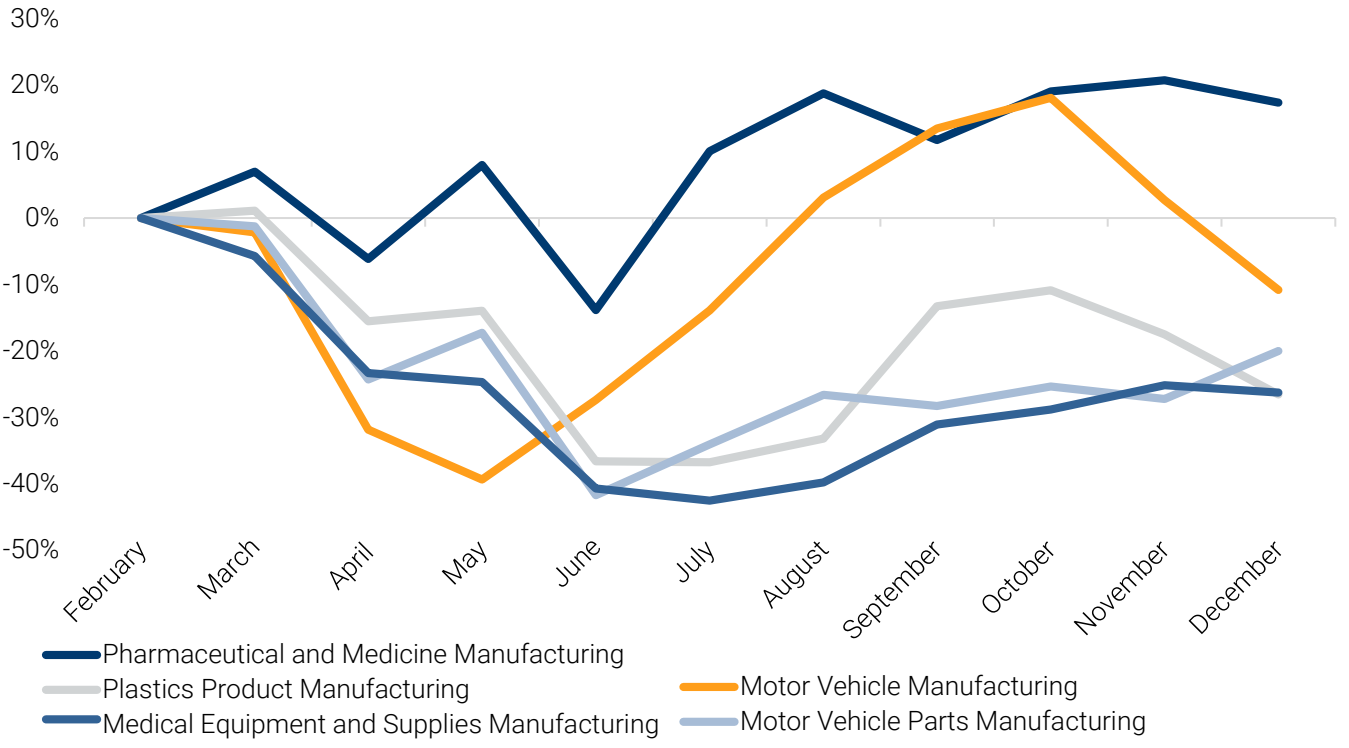
Job posting trends in advanced manufacturing and advanced services industries in Indiana, February - December 2020



Source: Brookings analysis of Emsi data.

Figure 21. Pharmaceutical and medicine manufacturing and motor vehicle manufacturing increased job postings during the recovery more than medical equipment, motor vehicle parts, and plastics industries

Job posting trends in selected advanced manufacturing industries in Indiana, February - December 2020



Source: Brookings analysis of Emsi data.

uncertainty associated with firms' operations, demand, and staffing.

A look at the advanced-services subsector reveals similar divergence. Job postings by Indiana software publishers, for their part, soared in 2020 and were running about three times the state's pre-pandemic level in December. This likely reflects increased expected demand for the software and digital services that help a socially distanced economy function, whether via enterprise software packages or online shopping platforms.

By contrast, a 13% plunge in scientific R&D services industry job postings from February through the summer and into fall may have reflected holds on corporate research projects and pauses on R&D spending (which are now easing). Similarly, a 10% decline (now significantly recovered) in the computer systems design and related services industry job postings may also reflect the slow easing of demand-side uncertainty about optional tech upgrades. These services are generally contracted by other firms, leaving their sales especially susceptible to the economic downturn as firms postpone purchases.

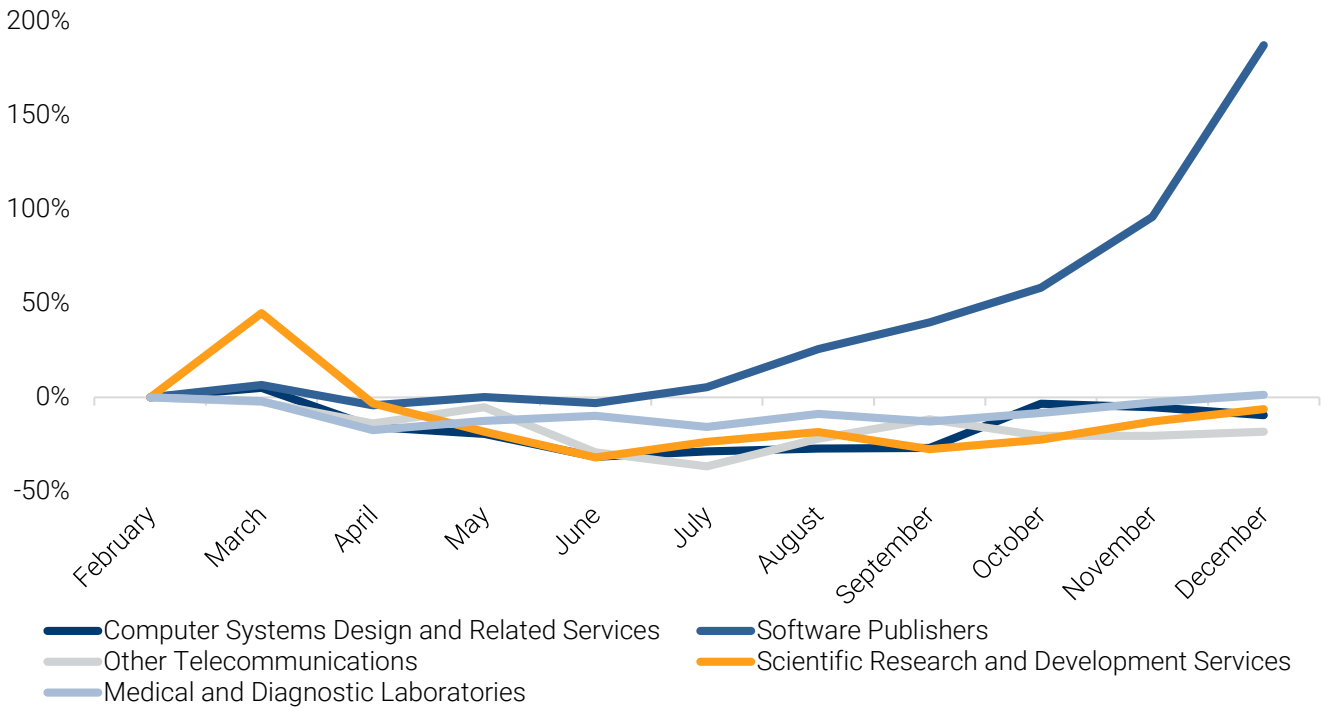
In sum, the signals offered by job postings data this year point to areas of great resilience in the Indiana advanced-industry sector, but also to large areas of uncertainty and possible shifts. The pandemic economy has reinforced the importance of the state's specializations in pharmaceuticals and medical equipment, given surging worldwide demand for both. Likewise, the year reinforced the value of Indiana's emerging software cluster.

At the same time, uncertainties associated with the pandemic's influence on operations, siting, demand, and staffing raise questions about what's coming next—particularly when it comes to productivity and employment.

At the industry level, the cyclicality of manufacturing could mean that the state's manufacturing-heavy advanced-industry sector will struggle. At the same time, any move toward reshoring by American firms

Figure 22. Software job postings have soared while advanced-sector services have maintained an only slightly depressed pace of hiring

Job posting trends in selected advanced services industries in Indiana, February - December 2020



Source: Brookings analysis of data from Emsi.

wary of long supply chains in the post-pandemic era might benefit Indiana. Likewise, ongoing technology trends intensified by social distancing could well alter the state's economic mix and competitiveness. Most notably, Brookings research has shown the tendency of firms to automate more in recessions, as the marginal cost of human workers soars in relation to firms' declining revenue.[16] Such adoption might reduce the demand for human labor, adding to the headaches for workers. But it also might increase the efficiency and competitiveness of Indiana firms.

The pandemic's impact depends on a region's industry mix

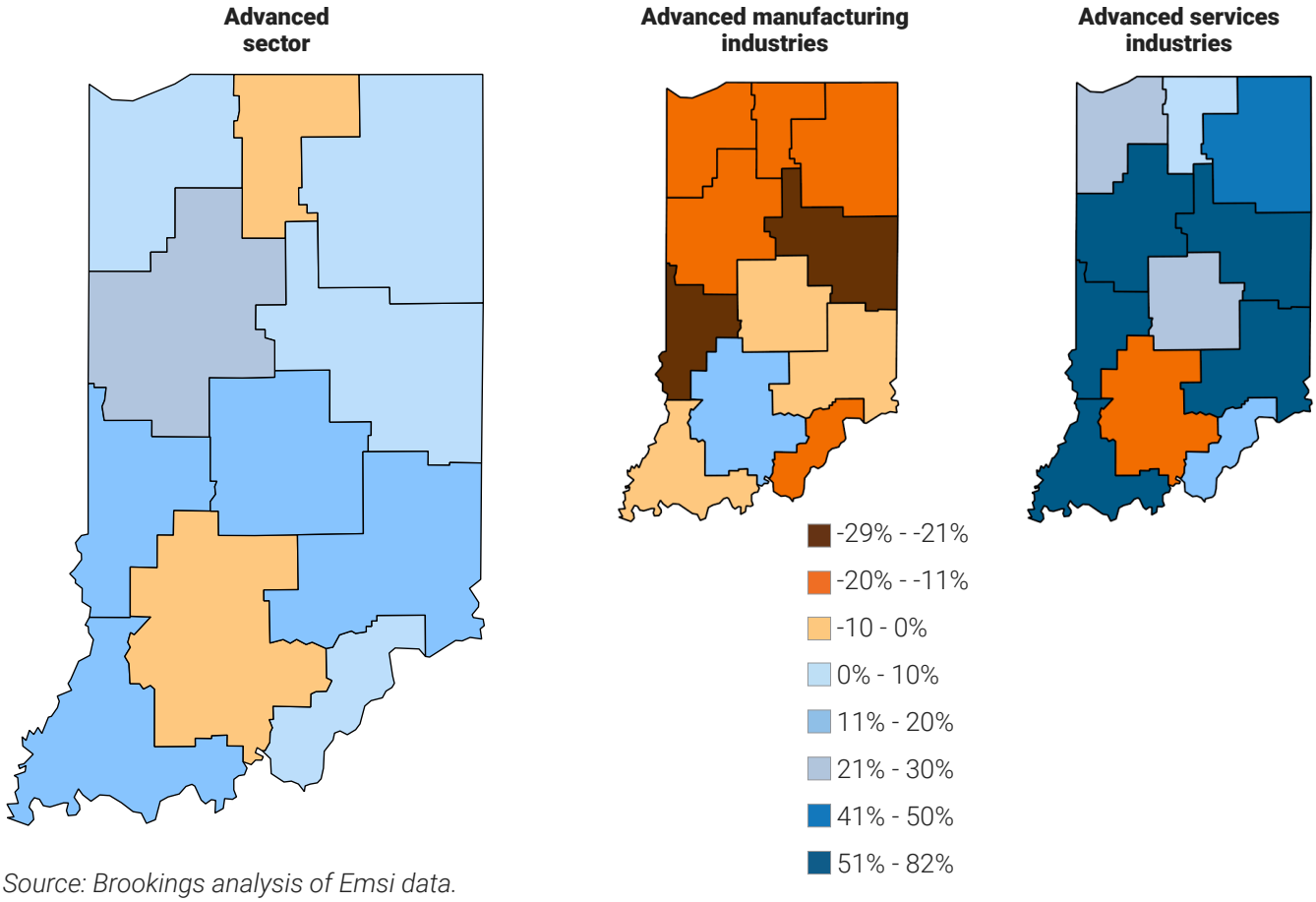
As with the aftermath of the Great Recession and the uneven recovery that followed, the effects of the current pandemic downturn have varied by region. Now, as recession turns to recovery, many regions face increased uncertainty about what comes next for the prospects of their advanced-industry sector.

As of December, for example, online job postings in advanced industries—a leading indicator of hiring intentions in the sector—trailed their pre-pandemic levels in many Indiana regions. **Indiana Uplands** and **Northern Indiana** have seen the deepest declines in job postings (a suggestion of future problems), while **West Central** and **Wabash Heartland** have seen the clearest signs of hiring vitality in their advanced-industry sectors.

Meanwhile, advanced-manufacturing trends are again driving advanced-industry sector developments as they did before the pandemic—though in different ways.

Map 5. Advanced-industries job posting activity has been unevenly distributed across the state's regions

Job posting trends in advanced industries by region, Indiana, February - December 2020



Source: Brookings analysis of Emsi data.

For instance, advanced-manufacturing job postings have risen in the **Indiana Uplands** during the pandemic given the region's strong pharmaceutical and medicine manufacturing industry, which will likely help drive its advanced-industry sector recovery. On the other hand, struggles in advanced manufacturing have limited job postings in **Southeast Indiana**, especially due to an uncertain outlook for medical equipment manufacturers.[17]

At the same time, advanced services have helped several regions. **Central Indiana** has seen heavy losses in advanced manufacturing offset by growth in often highly digital advanced services, much as what happened in the wake of the Great Recession. Data from between February and December shows that the rise in job postings in advanced-services industries has outpaced the total loss in job postings in advanced-manufacturing industries.

Other regions have also benefitted. Advanced industries job postings in **West Central Indiana**—supported by a more resilient advanced-services sector—have bounced back to pre-pandemic levels.[18] **Northeast** Indiana's advanced-services sector is also looking up, with a surge in software publisher job postings since February. On the other hand, **East Central Indiana** will likely experience a significant decline in advanced manufacturing employment opportunities, given a 15% job postings drop in industries such as motor vehicle manufacturing (though job postings in advanced services appear to forecast steadier hiring).[19] Meanwhile, declines in advanced-services job postings in the **Indiana Uplands** region portend strains there.[20]

The dynamic here is mixed: While pockets of resilience in advanced services are distributed unevenly around the state, the recovery of the much larger advanced-manufacturing sector remains sluggish. Overall, that suggests that relatively few Hoosiers appear likely in the coming months to find local opportunities to avail themselves of the high wages offered in the advanced sector unless the recovery truly surges.

In sum, much is at stake as the state's critical advanced-industry sector begins to negotiate its next decade amid the uncertainties of the COVID-19 recovery. Drift in the size and productivity of the sector in the last decade portends further erosion of the state's economic competitiveness, and if it is left unchecked, its standard of living as well.

In sum, much is at stake as the state's critical advanced-industry sector begins to negotiate its next decade amid the uncertainties of the COVID-19 recovery. Drift in the size and productivity of the sector in the last decade portends further erosion of the state's economic competitiveness, and if it is left unchecked, its standard of living as well.

ECONOMIC ISSUE #2: EMPLOYMENT SHOCKS AND WORKER TRANSITIONS

The second resilience factor—employment shocks and worker transitions—has been at the forefront of Indiana's economic story for decades, as trade gyrations, technological shifts, and other economic phenomena have generated significant disruption in the state.

Now, the COVID-19 crisis has generated a new and historic set of displacements, with thousands of firms and tens of thousands of workers forced to undergo tough changes in jobs and industries. Such shifts will likely persist, and more firms, workers, and places will likely need to pull off challenging transformations in order to adapt to changing conditions.

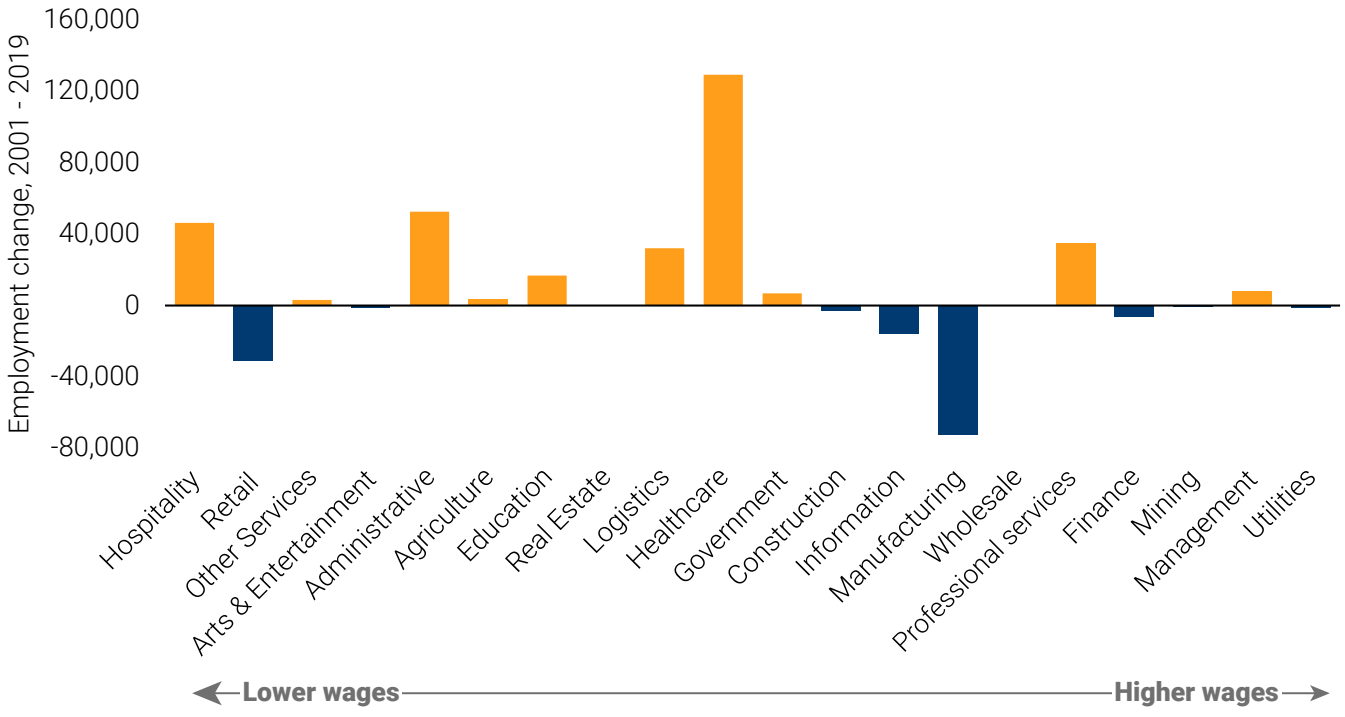
Recessions can 'reallocate' the economy—and create transition challenges for workers

The COVID-19 recession has not just been a blow to consumer demand and economic output. It may also be inflicting a major "reallocation shock" on Indiana, with challenging ramifications for workers.[21]

An economy faces a reallocation shock when the demand for inputs (such as labor and capital) shifts abruptly between industries. In such situations, firms and even entire sectors may incur lasting damage (resulting in permanent layoffs), as demand shifts to or reconcentrates in other fields. For example, recessions and their recoveries frequently bring about both widespread layoffs and an array of new hires, some in

Figure 23. Between 2001 and 2019, Indiana has seen massive employment reallocations from decent-paying manufacturing to lower-paying service industries

Absolute employment change by sector in Indiana, 2001 - 2019



Source: Brookings analysis of Emsi data.

new areas. With this can come both beneficial change and significant disruption.

Indiana workers have navigated difficult economic transitions for decades

To appreciate this risk, the state need look no further than its own experience during the last two recessions and expansions. Through those cycles, tens of thousands of middle-wage workers were displaced from blue-collar sectors into either low-wage service industries or out of the labor market entirely in a reallocation event of lasting significance.

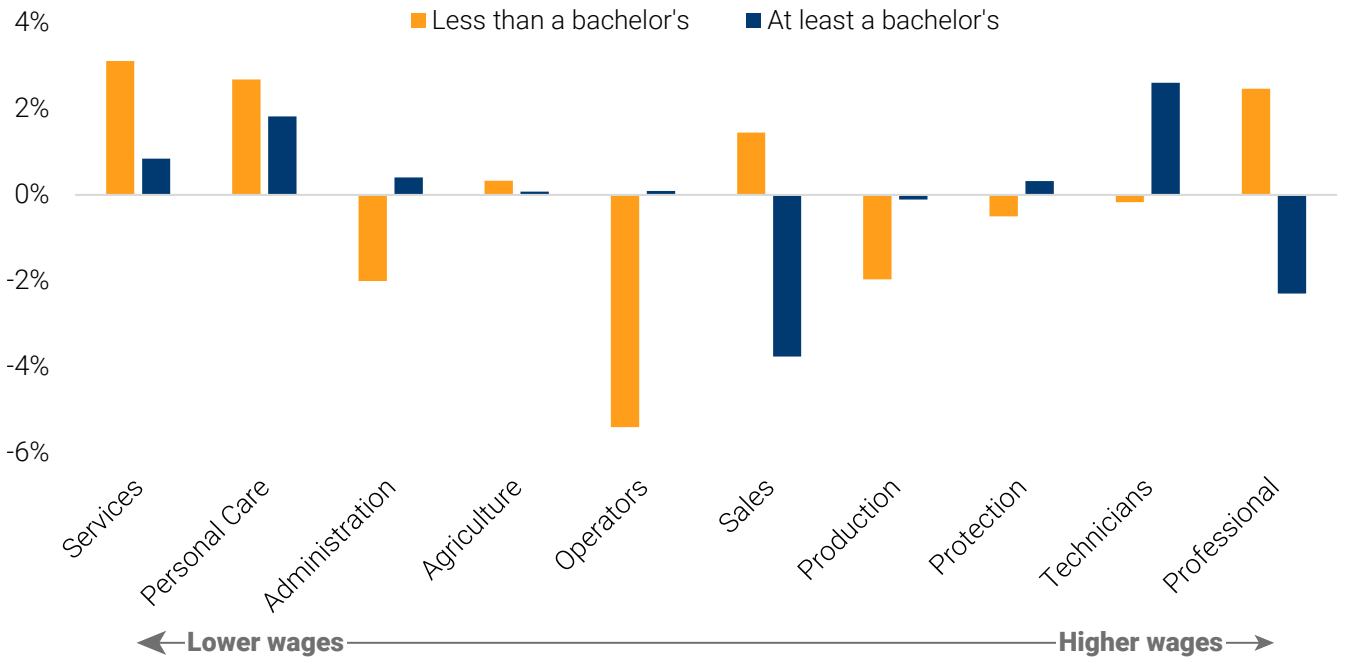
These shifts have been stark. Between 2001 and 2019 (and especially in the recessions of 2000 to 2001 and 2007 to 2009), the state lost over 72,000 jobs in the manufacturing sector—long a source of above-average wages for workers without a four-year college degree (See Figure 23). At the same time, 228,000 jobs were created in the lower-paying hospitality, administrative services, and health care sectors. This represented a massive shift in the industrial mix of the state, toward less productive, lower-paying locally traded service sectors.

A similar dynamic, meanwhile, has been playing out within industries across occupations (see Figure 24). Since 2000, in this respect, the state's labor market has become increasingly polarized, as middle-wage occupations have declined relative to low- and high-wage jobs.

Figure 24 shows that since 2000, Indiana workers without a bachelor's degree have become far less likely to be employed in middle-wage occupations in office administration, production, or as operators and laborers—reflecting an aggregate 9 percentage-point drop in the share of such workers employed in these types of jobs. By 2019, the share of all sub-baccalaureate Indiana workers employed in personal care and service jobs—the two occupation groups with the lowest average wages—had increased by

Figure 24. Indiana's labor market has become increasingly polarized, as middle-wage occupations as decline relative to low- and high-wage occupations

Change in occupation group's share of employment in Indiana, 2000 - 2019



Source: Brookings analysis of Emsi and the Economic Policy Institute's State of Working America Data Library data.

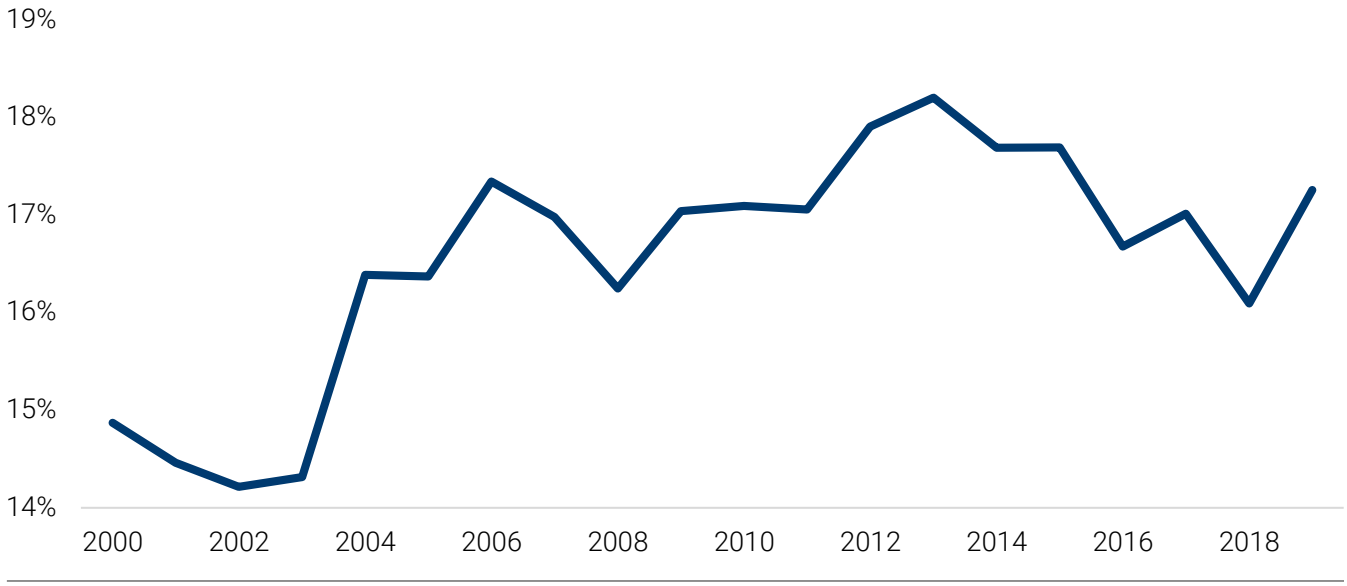
Figure 25. Indiana's real wages for noncollege workers have been stagnant for most of the last two decades, notwithstanding growth in the last few years before the pandemic

Real average hourly wage among Indiana workers without a bachelor's degree (2000 = 100), 2000-2019

Source: Brookings analysis of BEA and the Economic Policy Institute's State of Working America Data Library data.

Figure 26. Prime-age labor force nonparticipation has risen over the 2000s, as more workers struggled to transition to new employment in the aftermath of two recessions

Prime age labor force non-participation rate in Indiana, 2000 - 2019



Source: Brookings analysis of BLS data.

an aggregate 6 percentage points, while the share in well-paid professional, technical, and managerial jobs increased by only a net 2 percentage points. More educated workers, by comparison, have experienced more muted occupational changes.

Cumulatively, these reallocation trends have had a long-term depressive effect on wage growth and employment in Indiana over the last two decades, in particular among less-educated workers. In this respect, the combined effect of reduced demand for workers with less education and the reallocation of work to lower-wage sectors has placed significant downward pressure on wage growth and labor market participation in Indiana. Real average hourly wages among workers in the state fell in the aftermath of the Great Recession; among workers without a bachelor's degree, real wages did not return to their 2000 level until 2015.

Equally concerning has been the extent to which Indiana's reallocation bouts have contributed to a decline in labor force participation. Many workers who were displaced from middle-wage employment and lacked the requisite skills or credentials to transition into modestly expanding higher-wage occupations and sectors responded to these structural changes by leaving the workforce altogether. As a result, prime-age labor force nonparticipation rose about 3 percentage points between 2000 and 2012, before receding about 1 percentage point since then. This nonparticipation has put a permanent drag on Indiana's economy, as prime-age Hoosiers—especially those without a bachelor's degree—were less likely to be employed in 2019 than they were in 2000.

The pandemic recession could portend more long-term structural disruption

Now comes the COVID-19 recession, which looks like it may create its own structural reallocations, even if much of the immediate distress appears to be passing. Early signals of potential reallocation and more segmented structural change are reflected in Indiana's uneven recovery so far.

With the easing of social distancing requirements during the summer, employment in leisure and hospitality, retail, and related sectors rebounded. However, persistent job loss in other sectors indicates areas of potentially protracted worker dislocations.

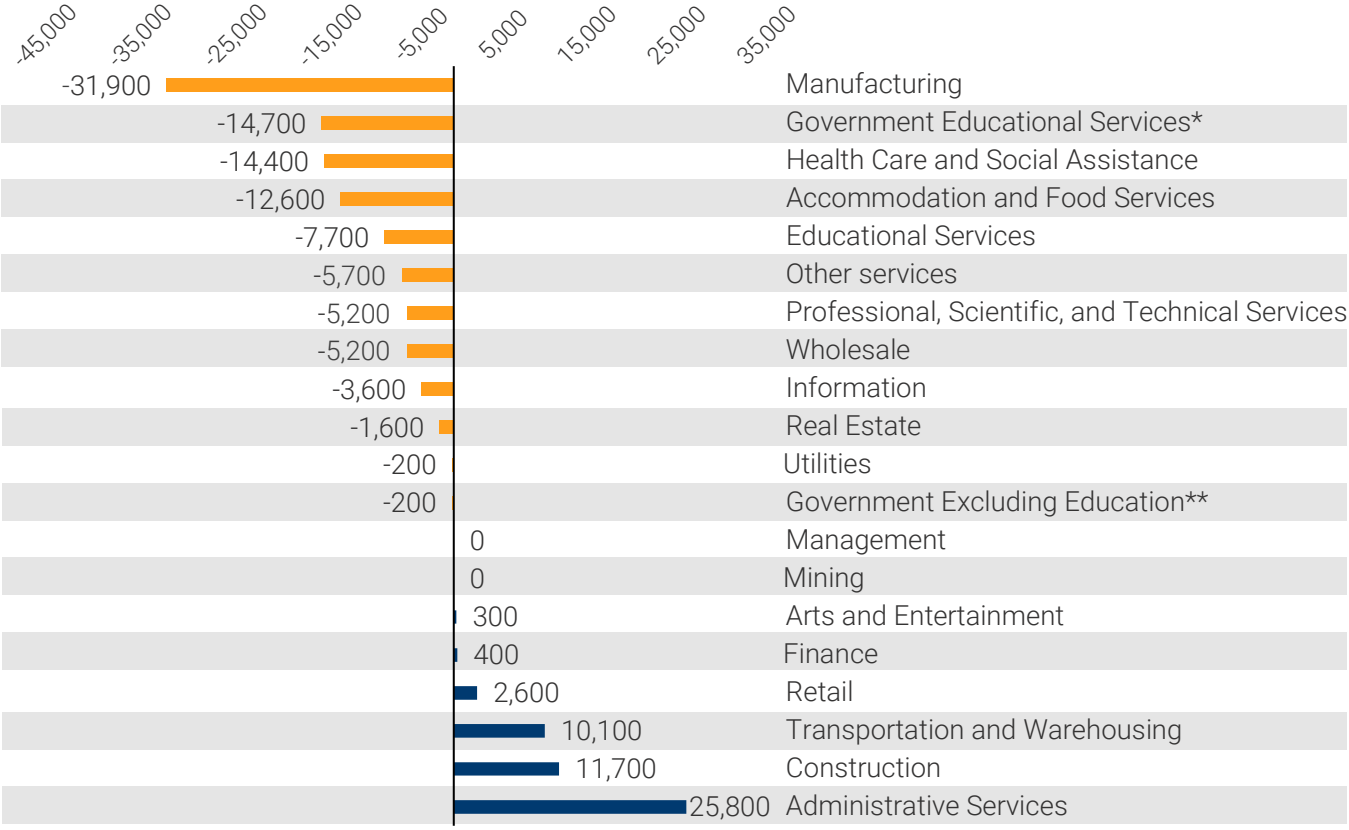
Many workers who were displaced from middle-wage employment and lacked the requisite skills or credentials to transition into modestly expanding higher-wage occupations and sectors responded to these structural changes by leaving the workforce altogether.

At an economy-wide scale, Indiana employment levels in November remained significantly below February levels in the manufacturing, public education, health, and accommodations and food services sectors, even as transportation, construction, and administration jobs surged and retail hired back workers who had been furloughed. Uneven recovery in some industries relative to others demonstrates the likelihood for challenging labor reallocation.

Additional information comes from the BLS Job Openings and Labor Turnover Survey (JOLTS), which showed that there were 10 job separations in Indiana for every 11 new hires in September. Such high labor force turnover is encouraging to the extent it implies job creation and the "churn" that promotes people and firms finding efficient new matches. At the same time, however, there were fewer aggregate openings to go around: 3% (5,000) fewer in September 2020 than in September 2019. More recent national information suggests that future openings in Indiana may continue to be unevenly distributed; while sectors such as logistics and operations are expanding their share of the nation's (and Indiana's) job postings and providing

Figure 27. Uneven patterns of industry employment decline and growth suggest potential structural changes

Change in total employment by industry sector in Indiana, not seasonally adjusted, February - November 2020



*Note: *Government Educational Services include workers in State Government Educational Services and Local Government Educational Services.*

***Government Excluding Education includes federal, state, and local government employees, excluding state and local schools. November data is a preliminary estimate.*

Source: Brookings analysis of BLS data.

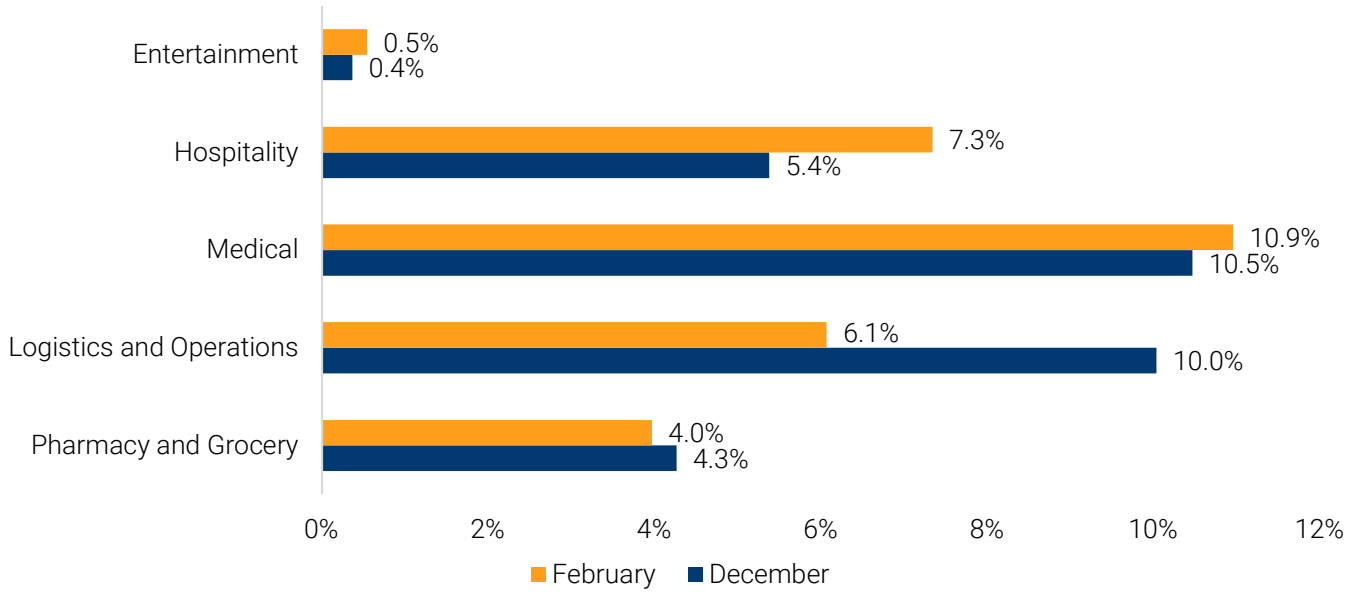
opportunities for rehiring, workers in more troubled sectors such as hospitality are seeing fewer postings and are likely encountering more difficult transitions back to work.

To the extent these early shifts persist, lasting structural change could accrue. Displaced manufacturing and public sector workers may well have to seek work in other areas, considering consistently high net job loss within those sectors. The movement of labor demand between sectors, meanwhile, will prove challenging for displaced workers who may not have the skills or networks to find employment in growing industries. And it bears noting that to date, Indiana employment declines have been disproportionately concentrated among lower-wage workers. Data from the BLS Current Employment Statistics (CES) program shows that at the supersector level, the industries that have undergone the largest employment reductions were often the ones with the lowest-paid workers.

With that said, though, the reallocation of labor will also likely occur *within* industries and sectors as well as between them. This is especially true within the retail and manufacturing sectors. In retail, evidence suggests that consumers are switching more purchasing to online shopping in the face of COVID-19.

Figure 28. Uneven recession and recovery impacts are altering the intensity of hiring across industries

Share of US job postings per sector, February and December 2020

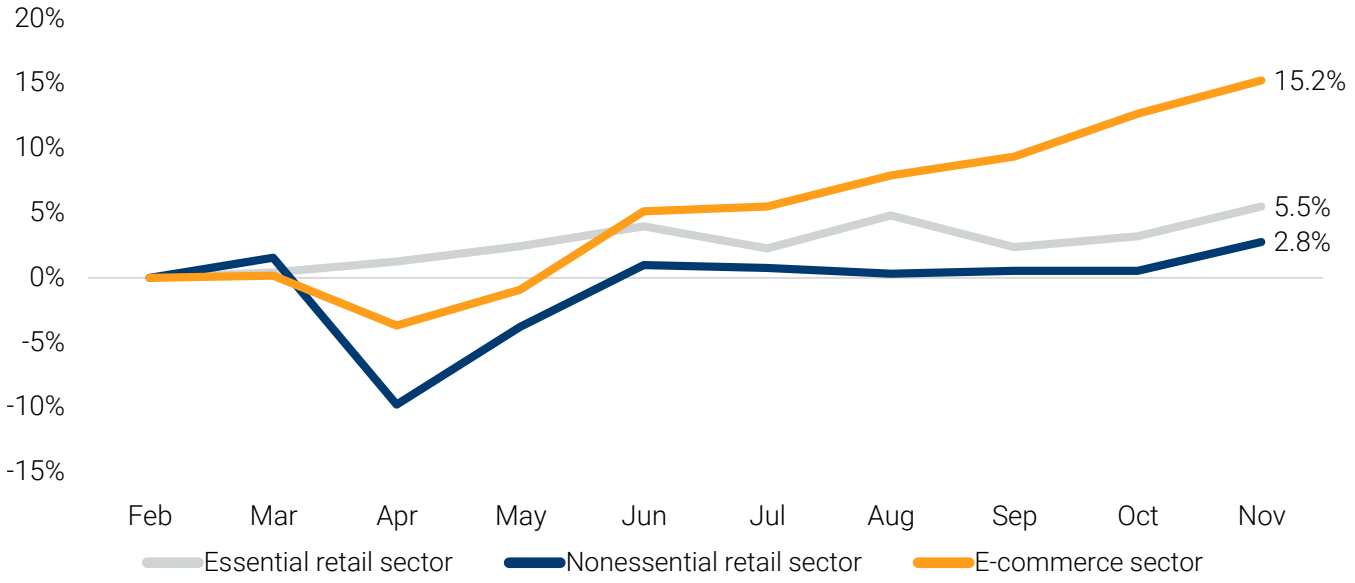


Note: The full list of industries included in each sector is available upon request.

Source: Brookings analysis of Emsi data.

Figure 29. In retail, e-commerce employment is surging while 'essential' physical retail is growing modestly and 'nonessential' retail is growing more slowly

Change in employment by retail subsectors in Indiana, not seasonally adjusted, February - November 2020



Note: The "Essential retail" sector includes these physical industries: Food and Beverage Stores (445), Health and Personal Care Stores (446), and General Merchandise Stores, including Warehouse Clubs and Supercenters (4523) . The "Nonessential retail" sector includes these physical industries: Motor Vehicle and Parts Dealers (441), Building Material and Garden Equipment and Supplies Dealers (444), and Department Stores (4522). The "E-commerce" sector includes Electronic Shopping and Mail-Order (4541) and Warehousing and Storage (493). The BLS does not report Indiana employment numbers for Gasoline stations (447) and Clothing and Clothing Accessories Stores (448), for example, so such industries are excluded from the analysis.

November data is a preliminary estimate.

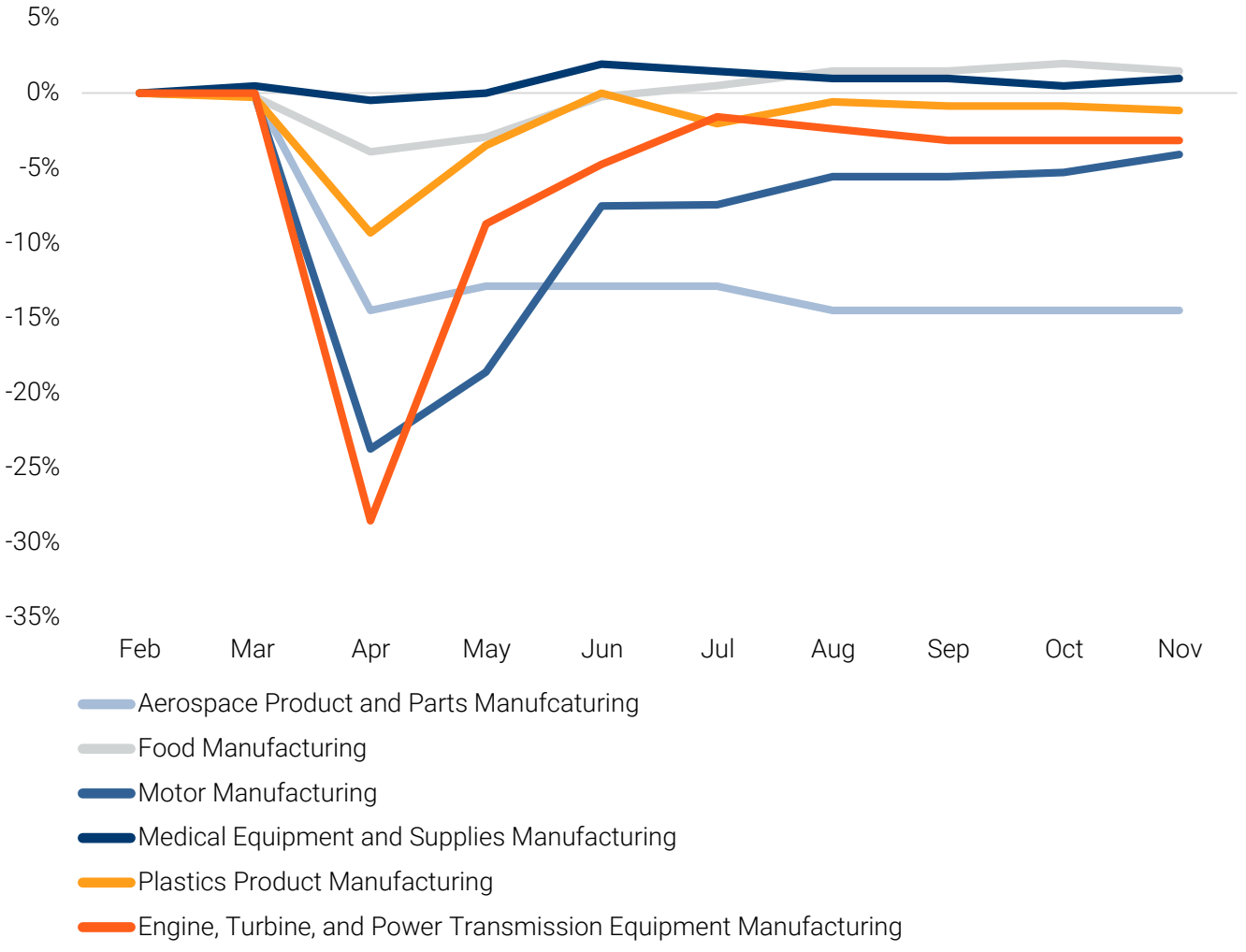
Source: Brookings analysis of data from BLS.

Figure 29, for example, shows that employment among essential and online retailers has grown from pre-pandemic levels. However, the recovery of nonessential retail has been slower, even as online retail employment has surged. With consumer behavior evolving, Indiana may see a permanent shift of work into the online retail space, as suggested by a continuous rise in employment among online retailers.

An uneven initial recover in the manufacturing sector, meanwhile, also indicates the potential for worker displacement. Figure 30 demonstrates that Indiana manufacturers of medical equipment and supplies have maintained their pre-pandemic levels of employment and that employment in food manufacturing has fully recovered. By contrast, Indiana employment in aerospace products and parts manufacturing has remained near April lows, reflecting the deep problems of a global air sector being hammered by decreased air travel.

Figure 30. In manufacturing, food and medical equipment production avoided spring layoffs while aerospace manufacturing remains deeply depressed

Change in employment by selected manufacturing subsectors in Indiana, not seasonally adjusted, February - November 2020



Note: Motor Manufacturing subsector includes Motor Vehicle Body (3362) and Trailer Manufacturing and Motor Vehicle Parts Manufacturing (3363).

November data is a preliminary estimate.

Source: Brookings analysis of BLS data.

All of this suggests how near-term disruptions can morph into longer-term or even permanent reallocations of labor demand, which may require workers from hard-hit manufacturing subsectors to develop new skills and connect with new networks as they look for new work. These longer-term structural changes can come at the expense of key industries and workers.

Nor is the threat of longer-term dislocation disappearing. Research published in June by economists José María Barrero, Nick Bloom, and Steven J. Davis forecasted that 32% to 42% of the pandemic's layoffs would become permanent—and since then, such dislocation has been taking hold.[22] By November, 36% of unemployed workers (3.6 million people) had suffered a permanent job loss in the COVID-19 downturn, according to the Bureau of Labor Statistics. Likewise, economists Gabriel Chodorow-Reich and John Coglianese project that permanent unemployment will continue to grow into the winter of 2021, possibly reaching the last recession's highs with 6.2 to 8.7 million people facing permanent job loss nationally.[23]

Figures like these demonstrate that sizable shares of the nation's and state's unemployed workers—the victims of the reallocation shock—could be facing a challenging reallocation path, and may require help. Additionally, these challenges are disproportionately impacting workers in the lowest quintile of the wage distribution, according to economist Tomaz Cajner and colleagues.[24] Such workers may need to change firms or sectors, some may need to update or alter their skills, and others may need to relocate or connect with new networks.

What these trends all point to, in sum, is the disturbing tendency of recession-driven reallocation episodes to meaningfully alter Indiana's economy and shift its occupational mix in ways that both damage the economy and painfully disrupt workers' ability to locate quality work. For that reason, Indiana leaders should remain alert to the fact that the flux of the year's pandemic shock could well coalesce into permanent structural shifts in the state's economy, with all the longer-lasting challenges that may bring.

Signs of reallocation in Indiana

News reports from Indiana confirm the reallocation picture. Even as the economy recovers, some firms and industries are expanding in Indiana while others contract. For example, the Indiana Restaurant & Lodging Association predicts that 41% of Indiana restaurants will remain closed in the long run.[25] And with not all manufacturing workers called back to work by fall, Ball State University economist Michael Hicks concluded that many manufacturing jobs may be permanently lost.[26]

With that said, some manufacturing firms are thriving in the COVID-19 economy. New Jersey-based Catalent has hired over 400 Hoosiers in Bloomington to support a partnership to manufacture COVID-19 vaccines from Moderna and Johnson & Johnson.[27] And with recreational boat sales at a decade-long high—as people turn to alternative recreation during social distancing—the Barletta Boat Company in Northern Indiana plans to open a $7 million facility in Bristol and hire up to 250 people.[28]

Pandemic-driven shifts are also leading to the aforementioned reallocation of work *within* industries. In the retail sector, Texas-based JCPenney filed for bankruptcy in the midst of the pandemic, permanently shutting down at least nine brick-and-mortar stores in Indiana.[29] At the same time, on the hiring side, Walmart announced in September that it will build a new 2.2-million-square-foot fulfillment center in Hancock County, to be staffed by up to 1,000 workers by the end of 2025.[30] In short, the shift to e-commerce may well portend long-term structural change—and dislocation for workers—as in-store associates lose out and retail work shifts toward labor in huge automated fulfillment centers.

Sources: Shakkira Harris, "41% of Indiana restaurants 'unlikely' to still be open in six months, survey finds," WRTV, September 22, 2020; Michael Hicks, "COVID could amplify factory employment trends," Kokomo Tribune, September 20, 2020; Kylie Veleta, "Potential COVID vaccine speeds growth at Catalent." Inside Indiana Business, May 28, 2020; Associated Press, "Indiana Boat Business See Coronavirus Business Boost," US News and World Report, July 25, 2020; Alex Brown, "JCPenney to Close Indiana Stores." Inside Indiana Business, June 4th, 2020; Alexandria Burris, "Walmart building fulfillment center in Hancock County, creating up to 1,000 new jobs." The Indianapolis Star, September 24, 2020.

ECONOMIC ISSUE #3: TOO FEW GOOD JOBS

Indiana's economy, meanwhile, is not producing enough good jobs. Even when the state has produced plentiful work opportunities, *quality* employment has remained in short supply—especially in the wake of the COVID-19 crisis.

Good-paying work is essential—but pay growth remains slow

It may seem self-evident, but high-quality employment—work that provides family-sustaining wages and benefits—is the foundation of broadly shared prosperity. In addition to allowing workers to comfortably support themselves and their dependents, such jobs also allow workers to save for unanticipated expenses, make major asset purchases like a car or home, and invest in their own education and that of their children. On top of these individual benefits, good-paying jobs stimulate additional local economic activity by boosting consumer demand and public revenues, thereby creating positive spillovers for regional economies more broadly.[31]

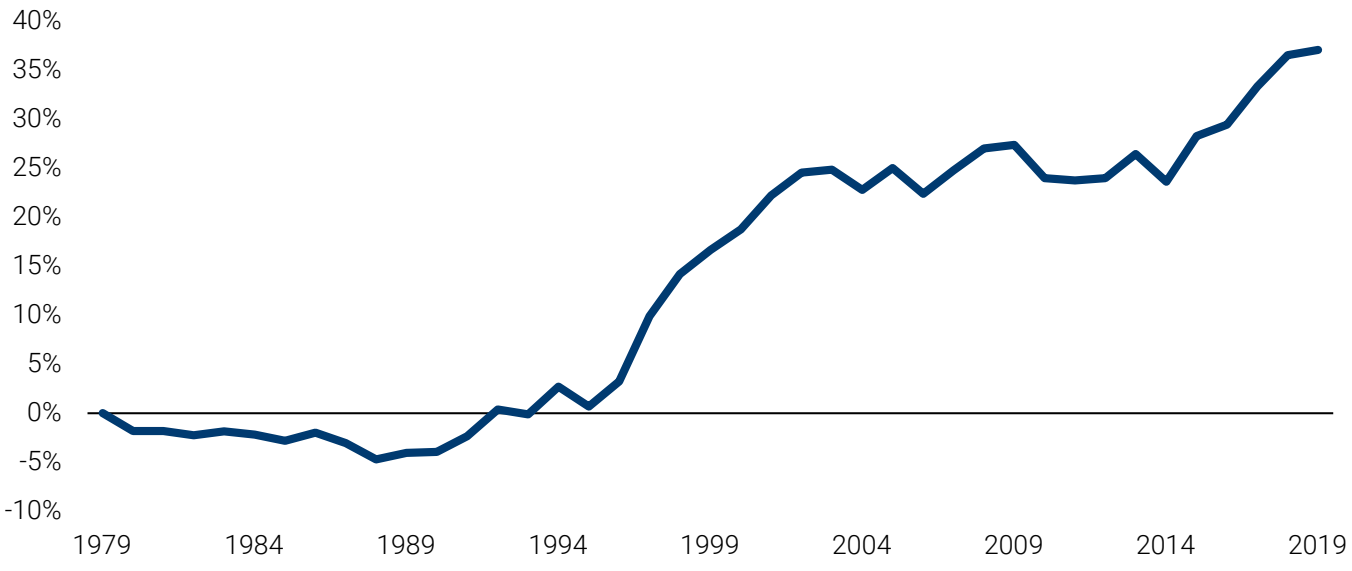
In this regard, decent pay across the lower half of the income distribution is especially valuable, since lower-income people have a greater marginal propensity to consume—in order words, they spend a greater share of their disposable income on goods and services, rather than saving it.[32] Given that propensity, the broad availability of decent-paying work lower down the pay spectrum tends to increase consumption and thus aggregate demand, which increases output and local business activity in general.

Unfortunately, though, wage growth has remained scant and sporadic in recent decades, both across the nation and in Indiana. Nationally, a majority of workers have failed to see any real wage growth in the last 40 years. Specifically, U.S. real average hourly wage growth since 1979 amounted to just 48%, or about 1% a year—and that was before the pandemic recession.[33]

The situation is even worse in Indiana. Real average hourly wages in the state have grown just 37% since 1979, from $15.52 per hour to $21.26 per hour in constant 2012 dollars—good for an annualized growth of 0.8%.

Figure 31. Real average hourly wage growth has been stagnant since 1979, except for a surge in the late 1990s and growth in the last few years before the pandemic

Percent change in real average hourly wage in Indiana, 1979 - 2019



Source: Brookings analysis of BEA and the Economic Policy Institute's State of Working America Data Library data.

That figure, though, obscures the fact that for most of the last four decades, average wages in Indiana did not grow at all. In fact, nearly all of the growth that has occurred took place in just two brief periods: 1995 to 2001 and 2014 to 2019, when labor markets were tight and state-level unemployment fell below 3%. That means that in only 10 of the last 40 years did wages grow consistently.

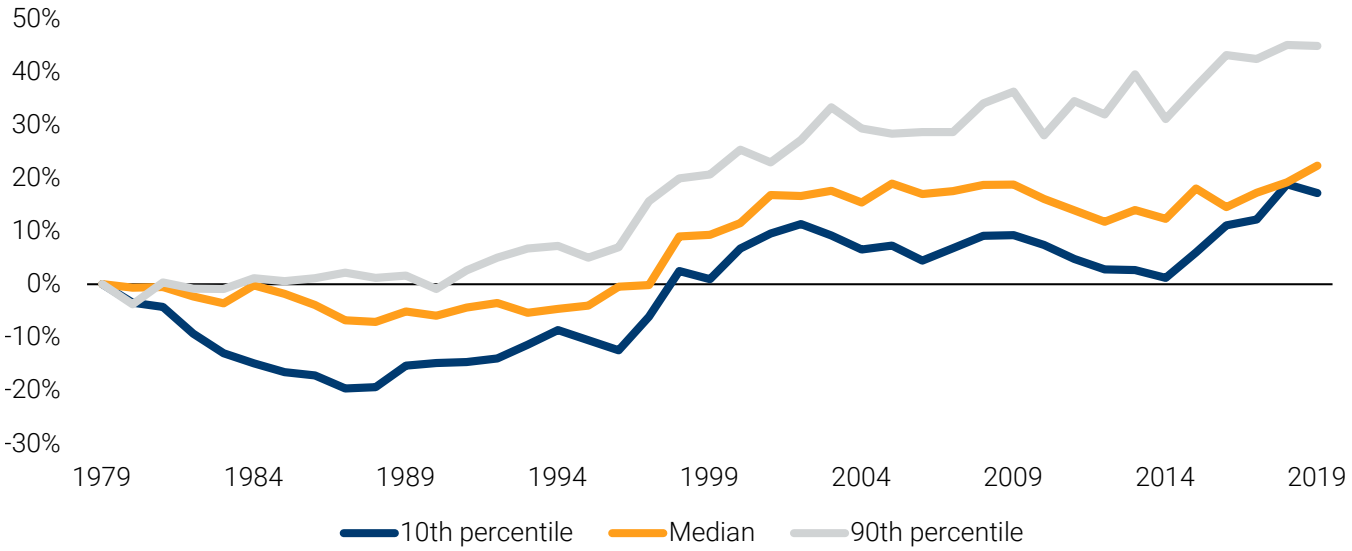
What's more, most of the gains that have been accrued flowed to the top 10% of earners in the state, who saw their wages grow by 45% since 1979. However, this means that even the top earners in Indiana still had wage growth below the nationwide average. Real median hourly wages in the state, meanwhile, grew by half that much, and for the bottom 10% of workers, by only 17%. But here too, looking at aggregate data over the period obscures the significant fluctuations—and at times actual wage losses—that the bottom 10% of Indiana workers suffered throughout this time. For example, prior to the most recent wage growth cycle in 2014 to 2019, the bottom 10% of Indiana workers had been hit so hard by the Great Recession that it was as if they hadn't seen any wage increases at all in the previous 35 years. For the bottom 10% of Indiana workers, wages in 2014—a mere $8.10 per hour—were the same, adjusted for inflation, as they were in 1979.

Wage stagnation has also had varied impacts across Indiana's workforce. While female workers' hourly wages have grown at a slightly faster rate in Indiana than male workers' since 2001, a gender wage gap on the order of 32% persists. Likewise, workers in the state with less than a bachelor's degree made some gains on workers with more education, though in 2019, the wage premium for a four-year college degree in Indiana was still roughly 78%.

Over the last two decades, however, Indiana has failed to make progress on closing the racial wage gap among workers. Nonwhite workers of all races in 2019 made on average 15% less than their white counterparts, up from 11% in 2001. Between 2003 and 2013, real average hourly wages for nonwhite workers actually fell 1.5% a year, while white workers saw their wages rise at a rate of 0.4% a year.

Figure 32. The fastest wage growth in recent decades has flowed to the top 10% of Indiana earners

Percent change in real hourly wage by income group in Indiana, 1979 - 2019



Source: Brookings analysis of BEA and Economic Policy Institute's State of Working America Data Library data

Table 3. Indiana continues to struggle with significant gender, racial, and educational wage gaps
Average hourly wage along demographic lines

Workers group	Avg. hourly wage, 2019	Avg. real hourly wage CAGR, 2001-2019
Male	$26.40	0.6%
Female	$20.00	0.7%
White	$24.00	0.7%
All other races	$20.80	0.5%
At least a bachelor's degree	$33.30	0.2%
Less than a bachelor's degree	$18.80	0.4%
Indiana	**$23.30**	**0.6%**

Note: "All other races" includes Black, Hispanic or Latino, Asian American, American Indian or Alaska Native, Native Hawaiian or Pacific Islander, and workers identifying as two or more races.
Source: Brookings analysis of data from BEA and Economic Policy Institute's State of Working America Data Library.

Indiana's 'good jobs' are crucial to prosperity

In light of the long-run wage trends outlined above, every state needs to attend to its stock of quality jobs—what Brookings calls "good jobs." Good jobs anchor the prosperity of a state, region, or neighborhood by providing workers and families a modest livelihood. As such, a location's good jobs deliver the sort of baseline, sustainable wages and benefits needed to support stable and productive lives.[34]

With that said, not enough Hoosiers enjoy the benefits of a good job. In 2018, roughly 1.2 million workers in Indiana held a "good job," accounting for just 42% of the workforce. What's more, while 65% of Hoosier workers with a bachelor's degree are employed in a good job, only 33% of those with less education are. Not only that, but the average wage of a good job in Indiana is around $36,900 a year—not particularly lavish.

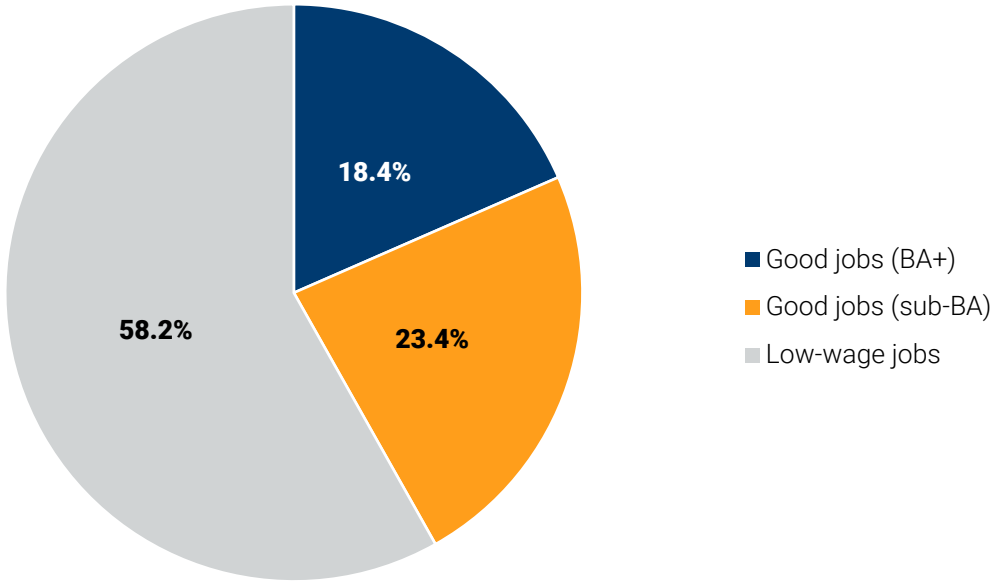
Still, Hoosiers are slightly more likely than the average worker nationwide to be employed in a good job. Across the country, only 39.1% of workers are in good jobs.

While the difference may seem trivial, if Indiana was to see its share of workers in good jobs fall to the national average, more than 79,000 more workers in the state would be toiling in lower-quality jobs.

For context, Indiana's share of workers in a good job places it 16th among all 50 states and Washington, D.C., and in a better position than all of its peer states except Illinois. In this regard, over half of workers in Washington, D.C., Massachusetts, New Jersey, Maryland, and Connecticut hold a good job, whereas in Arkansas, and Mississippi, less than a quarter of workers do. However, while Indiana's 42% share of workers in good jobs is higher than many states, it is nonetheless still too low to enable a majority of Hoosiers to make a comfortable living.

A key advantage for Indiana is that its good jobs are relatively more accessible to workers who lack a four-year college degree. In Indiana, a majority (56%) of the state's good jobs are held by workers without a B.A., whereas nationally the share is only 45%. As a result, Indiana ranks 11th among all 50 states and Washington,

Figure 33. Only about 42% of Hoosiers have a 'good' job
Share of workers by job type in Indiana, 2014-2018



Source: Brookings analysis of IPUMS USA 2014-18 5-year ACS microdata.

D.C. for its share of sub-baccalaureate workers in a good job.

What explains this favorable profile of Indiana's good jobs employment? The state's relative success in creating good jobs for less-educated workers has much to do with its industrial structure. Forty percent of Indiana workers in a good job are employed in utilities, manufacturing, construction, and logistics—though those sectors employ only 30% of all workers in the state (see Figure 34). The concentration of good jobs in these blue-collar sectors is even more significant for workers without a B.A.; over half of all sub-baccalaureate workers in a good job work in those four sectors, despite those sectors employing only 34% of all sub-baccalaureate workers.

Indiana's broader access to good jobs for workers without a bachelor's degree is central to the state's stock of good jobs and all of its benefits—although it may also contribute to the perception that postsecondary education is not necessary for success. Indeed, AEI polling for the Indiana GPS Project finds that nearly three-quarters of Hoosiers feel they can succeed without a four-year college education, compared to 63% of Americans as a whole.[35] That view may reflect the state's relatively abundant good-job opportunities that don't require a college education, but it ignores the importance of fast-changing skills demanded in good-job intensive industries.

Advanced industries, meanwhile, are the single largest source of good jobs in the state, accounting for 18% of all of Indiana's good jobs. Fully 62% of workers employed in the advanced-industry sector have a good job—more than 218,900 positions, with 59% of them held by workers without a bachelor's degree. In fact, for both bachelor's degree-holders and those with less than a four-year college degree, the share of workers in a good job in the advanced-industry sector is 20 percentage points higher than it is for each group of workers in the economy overall. For instance, while only 33% of sub-baccalaureate workers in the state have a good job, half of all sub-baccalaureate workers working in an advanced industry have one. That share rises to 84% for the college-educated.

Defining 'good jobs'

In keeping with previous Brookings work on job quality, this report stipulates that "good jobs" meet two criteria:

- The job should pay at least an annual wage threshold averaging $40,700 a year nationwide, which when adjusted for cost of living in Indiana is between $35,400 and $41,100, depending on the region.
- The jobs should provide employer-sponsored health insurance.

This wage threshold was set after consulting multiple localized living and family wage estimates, and is meant to reflect the minimum sufficient wage needed for either a single person or a two-earner household to meet their basic needs—food, shelter, transportation, child care—while still having enough remaining to save for unanticipated income loss. Employer-sponsored health insurance is both an important buffer against the financial risk of unexpected injury or illness and correlated with other nonwage benefits.

More specifically, Brookings's estimates are based on the share of workers in each state employed in a good job on five-year pooled samples from the American Community Survey for 2008 to 2012 and 2014 to 2018. A worker was identified as in a good job if her self-reported annual wage income was equivalent to at least $40,700 a year, adjusted to a regionally specific level using the BEA's Regional Price Parity indices; in a full-time, full-year position; and if she received health insurance through her employer. This comes to $19.50 an hour for 2,087 hours a year. Jobs that do not meet these criteria are referred to as "low-wage jobs" in this report. With that said, it is not possible to determine whether a worker had health insurance through their own employer or their spouse's, nor can we know if a worker is receiving wage income from multiple jobs. These estimates should therefore be thought of as upper limits on the true share of workers in a good job.

The table below lists the good jobs threshold in each region of Indiana:

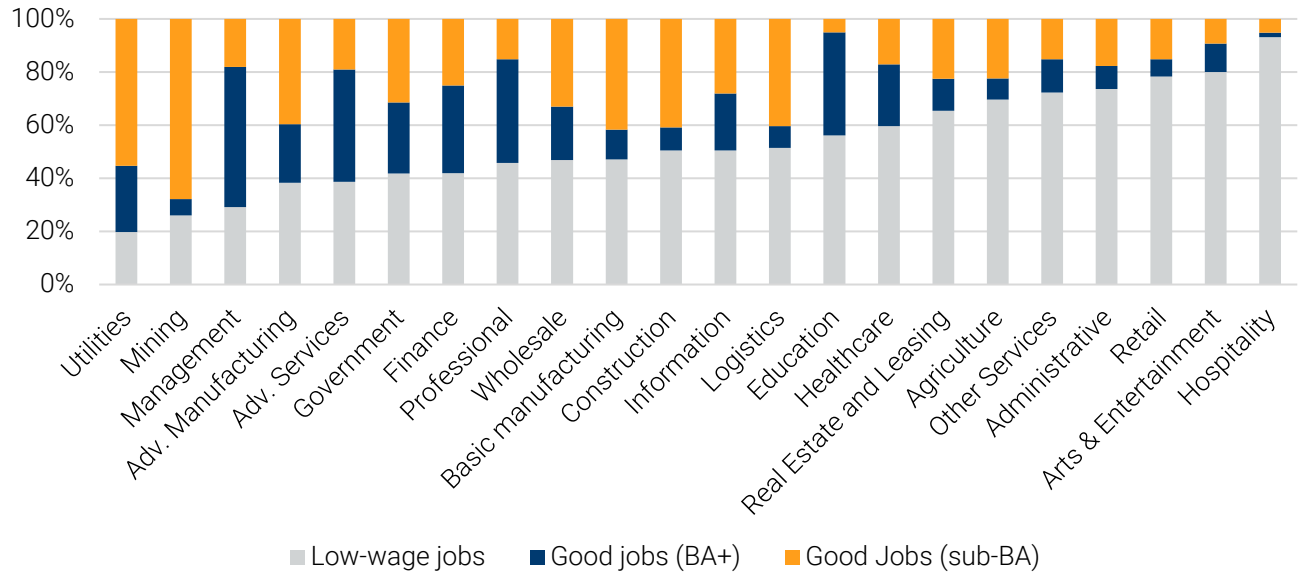
Table 4: Good jobs wage threshold (2,087 hours)

Region	Annual wage
Northwest Indiana	$41,100
Northern Indiana	$36,000
Northeast Indiana	$35,500
Wabash Heartland	$35,900
Southern Indiana	$36,500
Central Indiana	$37,600
West Central Indiana	$35,800
East Central Indiana	$35,400
Indiana Uplands	$36,100
Southeast Indiana	$35,600
Southwest Indiana	$35,600

Source: Brookings analysis of multiple sources.

Figure 34. Indiana's relative success in creating good jobs for less-educated workers reflects its industrial structure, with large utilities, basic manufacturing, construction, and logistics industries providing good-job opportunities

Share of sector employment by job type in Indiana, 2014-2018



Source: Brookings analysis of IPUMS USA 2014-18 5-year ACS microdata.

Table 5. Technical occupations tend to be rich sources of good jobs

Share of workers in a good job by occupation group in Indiana, 2014-2018

Occupation group	Share of workers in a good job, 2014-18
Engineering	80.2%
Computer	74.7%
Management	70.1%
Sciences	69.3%
Business	66.8%
Legal	66.3%
Health practitioner	62.4%
Maintenance	58.0%
Protective	50.8%
Construction	49.2%
Education	48.1%
Production	45.2%
Social service	43.8%
Arts & entertainment	38.5%
Sales	32.9%
Transportation	31.4%
Administrative	30.4%
Facilities	15.9%
Health technician	10.4%
Personal care	7.7%
Food service	2.7%
Indiana	**41.8%**

Source: Brookings analysis of IPUMS-USA 2014-18 5-year ACS microdata.

Despite the positives, Indiana has been producing too few good jobs for years

And yet, Indiana's stock of good jobs has remained too small and been growing too slowly for many years. Even though it compares favorably to most states in the size and accessibility of its stock of good jobs, only about 42% of the state's workforce possessed a good job between 2014 and 2018. That means that roughly 58% of Hoosiers—nearly two out of every three workers—does not work in a good job.

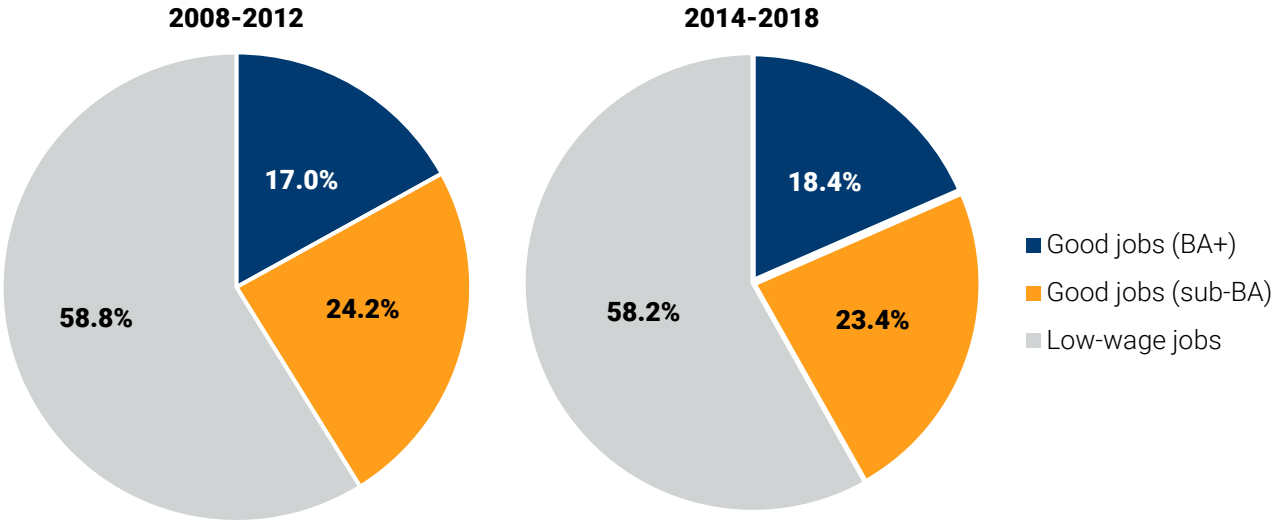
Nor have trends over the last decade substantially improved lower-income workers' lot. Over that period, the share of Hoosiers working in a good job barely budged, rising from 41.2% to 41.8%. Even the wage growth among workers in the bottom 10% of the pay distribution did not significantly alter the state's good-jobs profile, in part because of continued declines in the number of Indiana workers with access to employer-sponsored health insurance.

Figure 36 shows, in absolute terms, the number of good jobs in the state held by less educated workers has increased by just 20,000, while the number of good jobs held by college-educated workers increased by 73,000. The number of workers in low-wage positions, meanwhile, increased by 86,000. This signals the squeezing out of opportunities for Indiana workers without a bachelor's degree.

These changes reflect the polarization of Indiana's labor market, as middle-wage occupations are replaced primarily by lower-wage occupations in service sectors such as retail and hospitality. From 2014 to 2018, only one-fifth of Indiana workers in the retail sector were employed in a good job, while in hospitality sector, the figure was a shockingly low 6.8% of workers.

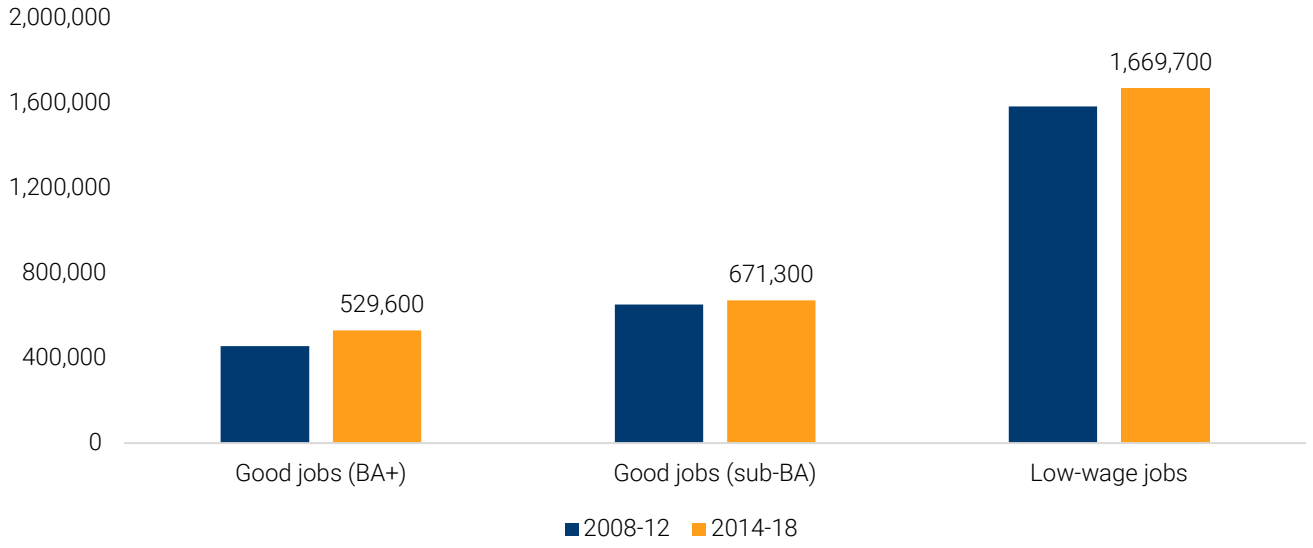
Indeed, the startling inequality in access to good jobs can been seen in a comparison of the share of good jobs by occupation type. In Table 5, one can see that good jobs range from a high of over 80% of engineering occupations, to less than 3% of food service occupations. As middle-wage occupations continued to be squeezed, more workers have been forced into personal care and services occupations, which have among the lowest share of good jobs in the state.

Figure 35. Indiana's share of good jobs has barely increased in the last decade
Share of workers by job type in Indiana, 2008-2012 and 2014-2018



Source: Brookings analysis of IPUMS-USA 2014-18 5-year ACS microdata.

Figure 36. The creation of good jobs in Indiana was proceeding slowly before the pandemic
Number of jobs by job type in Indiana, 2008-2012 and 2014-2018



Source: Brookings analysis of IPUMS-USA 5-year ACS microdata.

The pandemic recession is likely exacerbating Indiana's shortage of good jobs

The COVID-19 recession will likely reduce the state's core supply of good jobs, meanwhile. To be sure, the recession's impact in this area cannot yet be measured directly, given that this report's measure of good jobs is constructed using five-year samples. With that said, a few assessments can be hazarded by considering sector-specific employment trends and the concentration of good jobs in those industries.

Here, the most important single source of good jobs in Indiana remains the manufacturing sector. With manufacturing providing over one-quarter of the state's good jobs—and with good jobs comprising 57% of production jobs—the loss of manufacturing jobs has almost certainly diminished Indiana's good-jobs pool. In November, 32,000 fewer Hoosiers were working in factories than in February, meaning the crisis may have cost the state 18,000 good jobs in manufacturing.

Another source of disruption is education. Always somewhat variable with seasonal school year patterns, the sector shed jobs much earlier than is typical; in November 2020, it provided 17,100 fewer jobs than in November 2019. Encompassing 10% of the state's good jobs (the third-largest share of any sector) and playing a critical role in preparing other Hoosiers for good jobs, the loss of 14,700 state and local education jobs since February represents another blow to the state's stock.

It remains to be seen whether timely rehiring—along with ongoing growth in the good-job-intensive construction sector—will quickly rebuild the state's critical pool of good jobs.

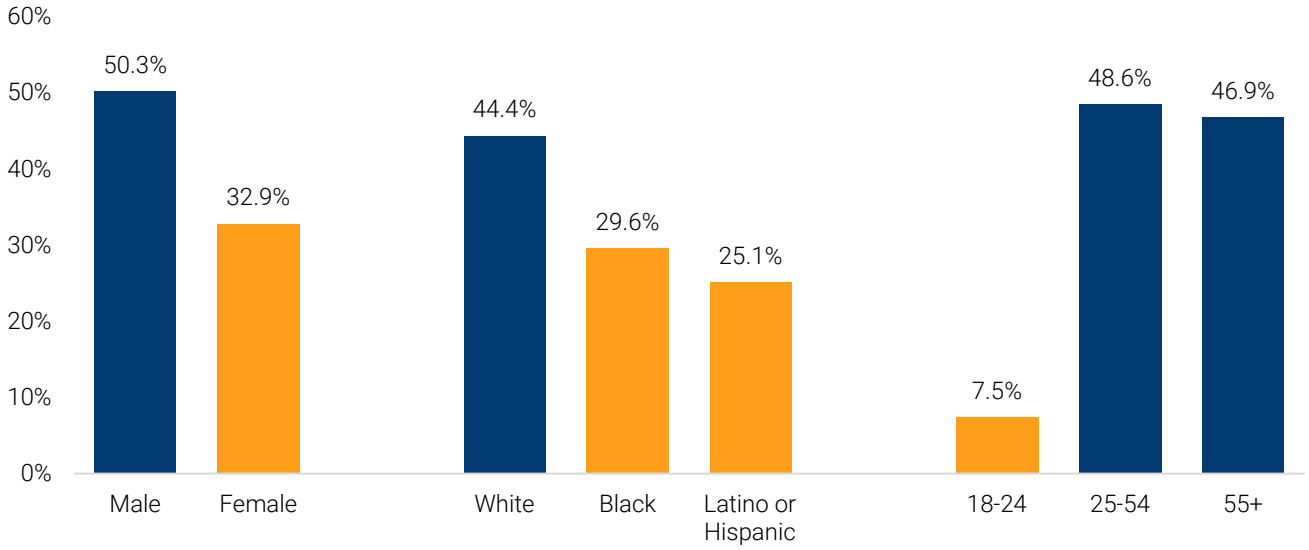
Indiana's good jobs are unevenly distributed

Most concerning about the current picture of good jobs in Indiana and elsewhere is the way that demographics and geography strongly shape access to quality employment.

While 50% of male workers in Indiana are employed in a good job, only 33% of women are. Similar disparities cut across racial lines: Over 44% of white workers in the state have a good job, compared to just 30% and 25% of Black and Latino or Hispanic workers, respectively. These divides reach their most extreme when age is taken into consideration; workers over the age of 25 are seven times more likely to hold a good job than workers between the ages of 18 and 24.

Figure 37. Men, white workers, and prime-age or older workers have greater access to good jobs; women, workers of color, and young people have less access

Share of workers in a good job by demographic group in Indiana, 2014-2018



Note: Asian American, Native American, Native Hawaiian, and those identifying as two or more races cannot be included because small sample sizes prevent statistically significant estimates.

Source: Brookings analysis of IPUMS USA 2014-18 5-year ACS microdata.

Most of this variation reflects the sort of gender-, race-, and age-based occupational stratification that pervades the U.S. economy and is being exacerbated by the recession. Women, for instance, account for over 90% of health technicians and 79% of personal care workers in Indiana, but only 10% and 7%, respectively, of workers in these occupations are in good jobs. Black workers are similarly overrepresented in these occupation groups in Indiana, while Latino or Hispanic workers are relatively more concentrated in facilities maintenance and farming, where only around 15% of workers have good jobs. The low share of young workers with a good job owes to their dramatic overrepresentation in food service and personal care occupations, where less than 10% of workers hold a good job.

Unequal access to high-quality employment by gender, race, and age also intersects with the geography of good jobs in the state. A worker in the Indiana region with the lowest number of good jobs has a 25% lower chance of finding high-quality employment than a worker in the Indiana region with the highest number of good jobs. The differential is even greater for workers without a four-year college degree.

Table 6 shows that Indiana's good jobs are concentrated in the **Central**, **Southwestern**, and **Southeastern** regions of the state, where more than 44% of workers are employed in a good job. These are also the regions where bachelor's degree-holders are relatively more likely to be in a good job, and with the exception of **Central Indiana**, also where sub-baccalaureate workers fare best.

Underlying this regional unevenness is the state's varied industrial geography. For instance, at least one in five workers in **Southeast**, **Southwest**, **Northeast**, and **Northern Indiana** is employed in manufacturing. Statewide, nearly half of all sub-baccalaureate workers in manufacturing industries are employed in a good job, the highest share of any sector except utilities and mining, which jointly account for a mere 1% of total employment in Indiana.

Table 6. Good jobs are concentrated unevenly across Indiana regions
Share of workers in a good job in Indiana by region and education, 2014-2018

Share of workers in a good job, 2014-2018			
Name	**All workers**	**Less than a B.A.**	**At least a B.A.**
Central Indiana	45.6%	32.0%	68.0%
Southwest Indiana	45.2%	38.1%	66.3%
Southeast Indiana	44.8%	35.4%	72.5%
Northeast Indiana	41.7%	34.9%	63.3%
Northern Indiana	41.3%	34.2%	63.4%
Southern Indiana	39.7%	32.4%	66.0%
Wabash Heartland	39.3%	31.3%	59.9%
West Central Indiana	38.7%	32.3%	61.0%
Northwest Indiana	38.0%	31.4%	58.1%
Indiana Uplands	36.9%	28.8%	58.5%
East Central Indiana	36.6%	29.9%	61.5%
Indiana	**41.8%**	**32.7%**	**64.7%**

Source: Brookings analysis of IPUMS-USA 2014-18 5-year ACS microdata.

As to what these variations imply for how the pandemic recession will affect local efforts to accumulate good jobs, local industry mixes will again determine a lot.

Northern Indiana, in this regard, may be among the regions most vulnerable to losing good jobs, due to its well-paying but hard-hit manufacturing sector. The Elkhart-Goshen and South Bend-Mishawaka metro areas each have seen a loss of over 10% of their manufacturing jobs this year despite their presence in the booming RV production subsector. Elkhart-Goshen is especially reliant on these manufacturing jobs, as the sector accounts for nearly half of all jobs in the metro area. Metro areas in **Wabash Heartland** also lost nearly 10% of their manufacturing jobs, likely diluting the region's pool of good jobs. Manufacturing employment decline is not the only source of good-job loss for **Wabash Heartland,** which also saw job losses in the sizable public sector, concentrated in the Lafayette-West Lafayette area. The **Indiana Uplands,** home of Indiana University Bloomington, also lost many good-paying public sector jobs.

Central Indiana, for its part, may be spared from the state's harshest good-job losses given that manufacturing accounts for less than 10% of the area's jobs. Other sources of good jobs there have not been significantly impacted by the recession as of yet, in part because many of them are conducive to telework. The area's strong professional services sector saw employment growth while declines in government employment remained modest.

The state may also see a divergence of good job loss within regions. Muncie in **East Central Indiana** saw over 12% of its government jobs disappear, and may be facing a slide into lower-paying service work given the state's growth in leisure and hospitality employment. At the same time, Kokomo, also in **East Central**, was the only metro area with manufacturing job growth, which may reflect potentially temporary hiring as auto parts manufacturers shift to medical equipment production to meet pandemic-era demands.[36] This growth bodes well for the area's resilience, but it also points to the uneven impacts across the state, which may generate reallocation and adjustment challenges for workers forced into new industries on the fly.

In sum, Indiana's recent and longer-term economic trends raise questions about the state's positioning on at least three key sources of basic well-being: its advanced industries, its reallocative capacity, and its supply of good jobs.

4 BEHIND THE TRENDS: CHALLENGES FOR ECONOMIC RESILIENCE

Behind Indiana's recent economic trends lie three underlying challenges to the state's economic resilience in the face of present and future shocks and competition.

As Indiana seeks to engineer an economic recovery, these deeper issues have likely been holding the state back, in many cases since long before the onset of the pandemic recession. Along these lines:

- Trends in technology investment reveal shortfalls in digital spending by Indiana firms, the creation of too few digitally intensive occupations across the economy, and too many connectivity gaps for a state with tech aspirations.
- The state's pandemic experience demonstrates that Indiana faces a shortage of jobs in key areas, with industry shifts and long-standing skills and matching challenges complicating recovery and workers' reemployment.
- Public policy has fallen short of sufficiently addressing national economic trends that have been depressing pay and hollowing out the wage distribution.

CHALLENGE #1: SLOW TECHNOLOGY ADOPTION KEEPS PRODUCTIVITY AND WAGES LOW

The link between technology adaptation (especially digital adoption) and productivity and economic resilience underscores the necessity for Indiana to keep up with peer states amid the "digitalization of everything"—one of the defining trends of the pandemic year.

Given the power and pervasiveness of digital technologies, all states and regions need to drive digital adoption, promote digital skills, and work toward universal broadband connectivity. That Indiana's economy runs the spectrum from legacy manufacturing in need of modernization to the most AI-powered portions of the life sciences makes these priorities even more critical.

However, several issues are going to complicate the state's efforts to keep up on digital absorption and economic productivity, including:

- The state's firms are investing too little in technology
- More digital jobs and skills are needed
- Gaping broadband connectivity gaps are holding the state back

Indiana firms are investing too little in technology

First, the pace of digital adoption in the Hoosier economy has been too slow. This matters because the "digitalization of everything" is challenging every worker, firm, industry, and region to internalize digital technologies and processes, ranging from basic enterprise software and cloud computing to automation, the Internet of Things, big-data analytics, and artificial intelligence (AI).[37]

Without a doubt, digitalization has its own disruptive effects. But because these technologies have such broad-based potential to drive innovation and productivity growth, the spread of digital technology into every portion of the economy has at once increased the potential gains available to the individuals, firms, and states that master it while also increasing the stakes for those that lag.[38]

How IT drives productivity across the whole economy

No technology better epitomizes how advanced industries support economic growth than information technology (IT). And IT, as it happens, is a core driver of productivity growth.

Prior to the mid-1990s, productivity growth from IT remained almost exclusively within IT firms themselves. Yet in the decade following 1995, productivity gains from IT came predominately from firms outside of the IT sector, particularly in high-value advanced industries such as management and R&D consulting, medical devices, and precision instrument manufacturing. All kinds of firms began leveraging IT to improve operations and grow, to the point that IT was responsible for two-thirds of U.S. productivity growth. Research by Jorgenson, Ho, and Samuels shows that total factor productivity increased sharply in sectors that used IT extensively during the 1990s and fell in those that did not. From 1995 to 2000, sectors using IT registered 10 times higher total factor productivity than other sectors.

Since then, more industries have invested in IT, but much more adoption remains necessary. The further dissemination of IT into large and conspicuously lagging sectors—including manufacturing, logistics, health care, and the broader service sector—promises to achieve badly needed productivity gains. Meanwhile, Saniee and others foresee a second productivity jump in the next 15 years tied to current technology gains and the Fourth Industrial Revolution, driven by the spread of advanced, intelligent systems.

Sources: Dale Jorgenson and others, "Information Technology and U.S. Productivity Growth: Evidence from a Prototype Industry Production Account," Journal of Productivity Analysis, 35(2) (2011); Saniee and others, "Will Productivity Growth Return in the New Digital Era" Bell Labs Technical Journal 22 (2017).; Brynjolfsson, Erik, Daniel Rock, and Chad Syverson, "Artificial intelligence and the modern productivity paradox: A clash of expectations and statistics," Working Paper 24001 (Cambridge, MA: National Bureau of Economic Research, 2017).

Table 7. The more digital an industries' occupations, the higher its pay, productivity, and productivity growth
Change in mean digital score, average wage, and productivity by sector

Sector	Mean digital score and change		Avg. wages and CAGR		Productivity and CAGR	
	2019	2012-19	2019	2012-19	2019	2012-2019
Professional Services	67	3	$69,600	1.2%	$139,900	0.9%
Information	65	7	$56,600	1.6%	$226,000	5.1%
Finance	64	1	$61,200	0.8%	$235,000	1.1%
Management	63	3	$73,400	1.3%	$140,700	3.0%
Utilities	57	1	$74,500	1.1%	$518,200	0.0%
Education	54	6	$50,000	0.4%	$80,000	-0.7%
Real Estate	53	2	$44,800	1.3%	$1,043,600	-0.5%
Wholesale	52	1	$55,700	1.2%	$172,300	0.0%
Healthcare	51	7	$54,300	1.1%	$78,000	0.8%
Retail	48	2	$32,300	0.7%	$64,900	2.1%
Other Services	48	6	$38,300	0.5%	$97,200	-0.4%
Arts & Entertainment	45	6	$37,000	1.7%	$96,200	-0.6%
Manufacturing	44	-1	$49,700	0.6%	$184,800	0.3%
Logistics	43	4	$45,300	-0.1%	$97,500	-1.7%
Hospitality	41	5	$24,100	0.9%	$38,300	0.6%
Administrative	40	2	$36,300	1.1%	$58,900	0.5%
Construction	40	2	$55,100	0.1%	$105,300	-2.7%
Advanced Industries	51	-2	$57,800	0.9%	$298,300	0.3%
Advanced Manufacturing	46	-3	$54,300	0.8%	$282,500	-0.6%
Advanced Services	77	9	$80,200	2.2%	$377,600	2.6%
Indiana	**49**	**3**	**$46,800**	**0.8%**	**$123,700**	**0.6%**

Note: Productivity and average wage change calculated as compound annual growth rates in Indiana. Sectors ranked by mean digital score in 2019.

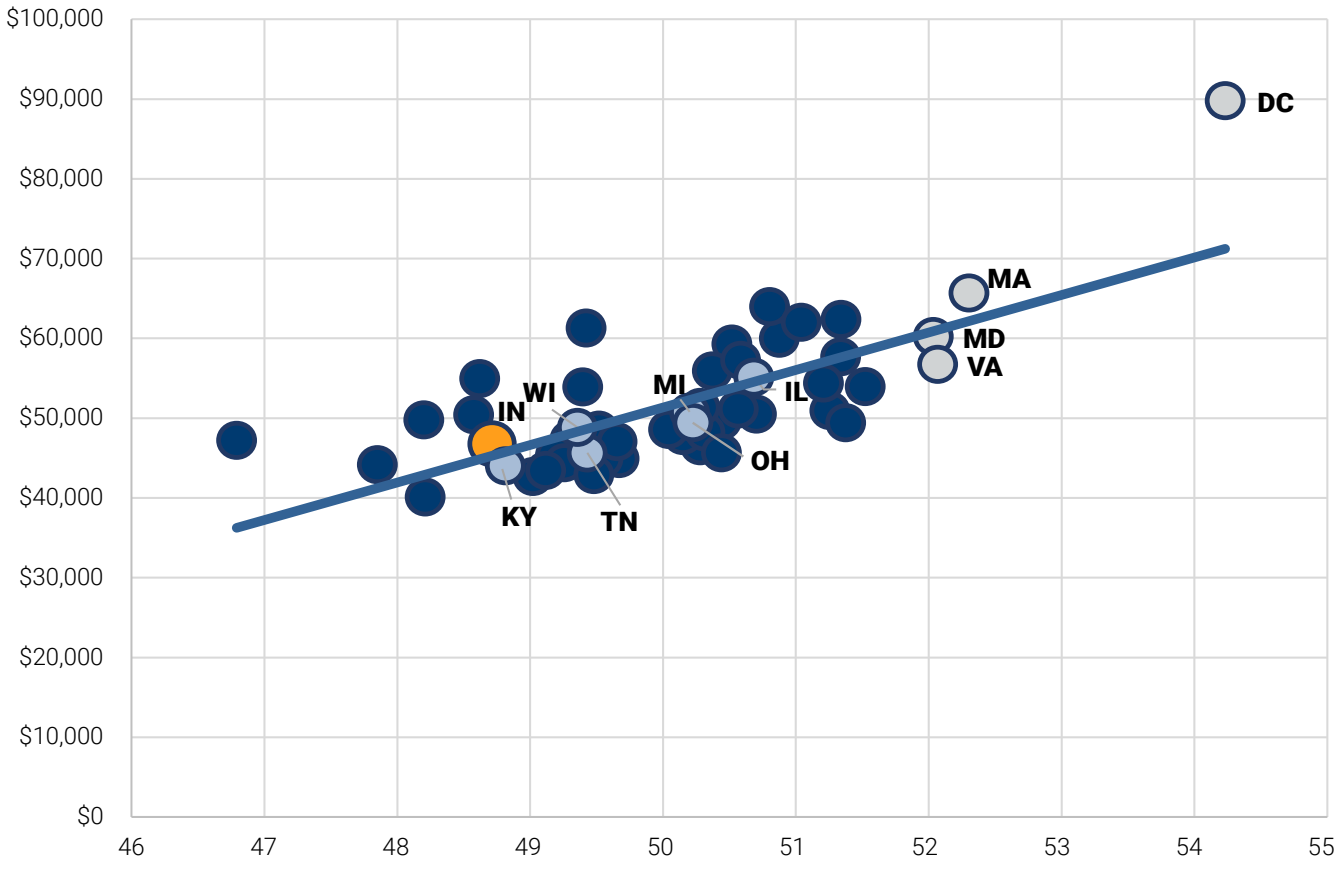
*Source: Brookings analysis of BEA, BLS, Emsi, and O*NET data.*

In the past, the spread of digital technology through the economy has been a central driver of improved productivity—and it is expected to be that again.

Speaking to this, Brookings research for this report quantifies the digitalization of all U.S. occupations and documents that the wage, productivity, and growth rates of different industrial sectors in Indiana tracks—as elsewhere—with their digital intensity.[39] The more digitally oriented a sector's workers are, the better its economic performance has been, with highly digital industries such as professional services and information performing at high levels in Indiana. Much of this effect owes to the link between digital work and workers' education levels, but not all of it does; digital work delivers distinct economic benefits.[40] By contrast, less digital sectors in the state—such as hospitality, in which a smaller share of the tasks are performed digitally—have performed at lower levels.

The same link between improved economic outcomes and digital skills pertains across places, with states' average earnings also highly correlated with their mean digital scores. For example, Maryland, Massachusetts, and Virginia—all of which share the nation's overall highest mean digital scores of around 52 across all their occupations—enjoy average annual wages of over $56,000. By contrast, the average wage in Nevada—with the lowest mean digital score (47) in 2019—remains around $47,000 a year.

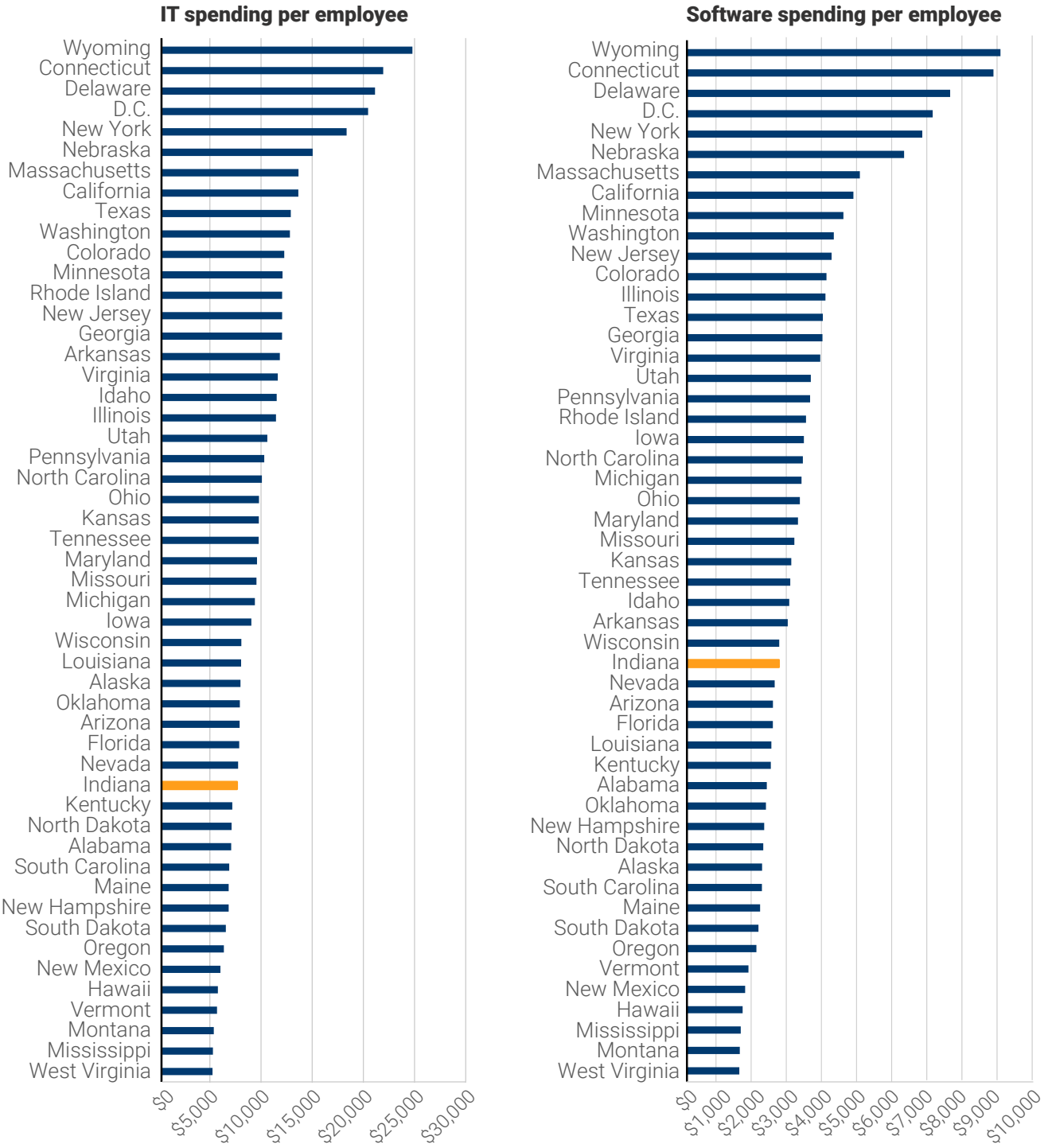
Figure 38. States' mean annual wages are correlated with their mean digital scores
Digital score and mean annual wage by state, 2019



*Source: Brookings analysis of BLS and O*NET data.*

Figure 39. Indiana firms' IT and software spending per employee trails many peer and competitor states

IT and software spending per employee by state, 2016



Source: Brookings analysis of Harte Hanks data.

In Indiana, meanwhile, digitalization has been proceeding too slowly. Overall, the state's 2019 mean digital score of 49 placed it in the bottom third of states, up just 3 points in the decade—only average for its peers. To be sure, industries ranging from professional services, information, finance, and management have reached respectable levels of digital adoption, with mean scores in the 60s. What's more, the digital intensity of the state's advanced-services sector soared 9 points between 2012 and 2019—outstanding by any standard.

With that said, however, the pace of digital adoption in Indiana could have been better in the pre-COVID-19 period. Both the general manufacturing sector and the advanced-manufacturing sector actually grew *less* digital in the decade, as each apparently shifted toward slightly less digitally intensive activities and workers. As a result, the state's advanced-manufacturing sector now has a mean digital score of 46—fully 12 points below national leaders in digitally oriented advanced manufacturing such as Massachusetts and California.

Contributing heavily to this drift are what appear to be subpar investments in digital capital among Indiana firms. Anecdotal accounts have long noted Hoosiers' aversion to risk on business investments. More recently, a survey of Indiana business managers on adoption of the digital technologies that define the so-called Fourth Industrial Revolution—commonly referred to as "Industry 4.0"—suggested mixed progress by Hoosier firms, whether it be on cloud computing and big-data analytics or autonomous machines and AI.[41] According to the survey—from Conexus Indiana and Indiana University's Kelley School of Business—many mid-revenue operations seem to be taking a wait-and-see approach, although larger firms are more likely than others to dedicate a budget to technology adoption.

With that said, new research for this report—utilizing firm-level expenditures data from the tech sector marketing firm Harte Hanks—suggests a substantial digital technologies investment problem across the Indiana economy.[42] According to the Harte Hanks data for 2016, Indiana ranks 37th among states and Washington, D.C. for its firms' annual per worker IT spending ($7,400, compared to $11,100 nationally). That level of IT expenditure places the state sixth of seven among peer states. Likewise, firm software spending in Indiana also lags, as the state's spending level of $2,700 per worker ranked 30th among the 50 states and Washington, D.C. and fifth among peers in 2016.

The investment deficits do not appear to center only on legacy manufacturing firms or small enterprises. According to the Harte Hanks data, IT underinvestment pervades virtually all segments of the state's economy.

In this respect, the state's basic and advanced-manufacturing sectors have invested at rates closest to the 50-state norm, although neither sector ranked higher than fifth among the Indiana's peers. Across the rest of

Table 8. IT investment per employee by multiple Indiana industrial sectors consistently lags
IT investment by selected sectors per employee, 2016

Sector	Indiana	U.S.	IN state rank	IN peer rank
Manufacturing	$8,900	$14,300	27	5
Services	$6,900	$10,500	34	5
All	$7,400	$11,100	37	6
Advanced manufacturing	$12,300	$20,400	26	5
Advanced services	$12,000	$30,800	40	6
All advanced industries	$12,300	$25,000	37	5

Source: Brookings analysis of Harte Hanks data.

the state's economy, IT spending remains significantly lower. Most notably, the state's basic and advanced services each ranked in the bottom quintile—just 40th among all states and sixth among peers—for their low investment levels.

Intriguingly, while large firms with over 1,000 employees spend much more per worker per year on IT ($14,300) than medium-sized ($6,500) and small ($6,400) firms, their IT spending per employee trailed the U.S. average more. While IT spending was 81% of the U.S. average among small firms in Indiana, the figure was just 61% for large firms (and 77% for medium-sized firms).

In sum, new evidence suggests the state's firms and industries are likely underinvesting in one of the best-recognized inputs to productivity and wage gains: digital adoption.

More digital jobs and skills are needed

The effect of Indiana industries' low digital investment on competitiveness isn't the state's only digital adoption issue. A second concern is the relatively limited digital orientation of its jobs and workers, especially when it comes to middle- and lower-skilled positions. On this front, Indiana lacks the widespread digitally oriented work and workforce needed to prosper amid the "digitalization of everything." All states need IT-enhanced jobs and workers, yet Indiana has too few of both.

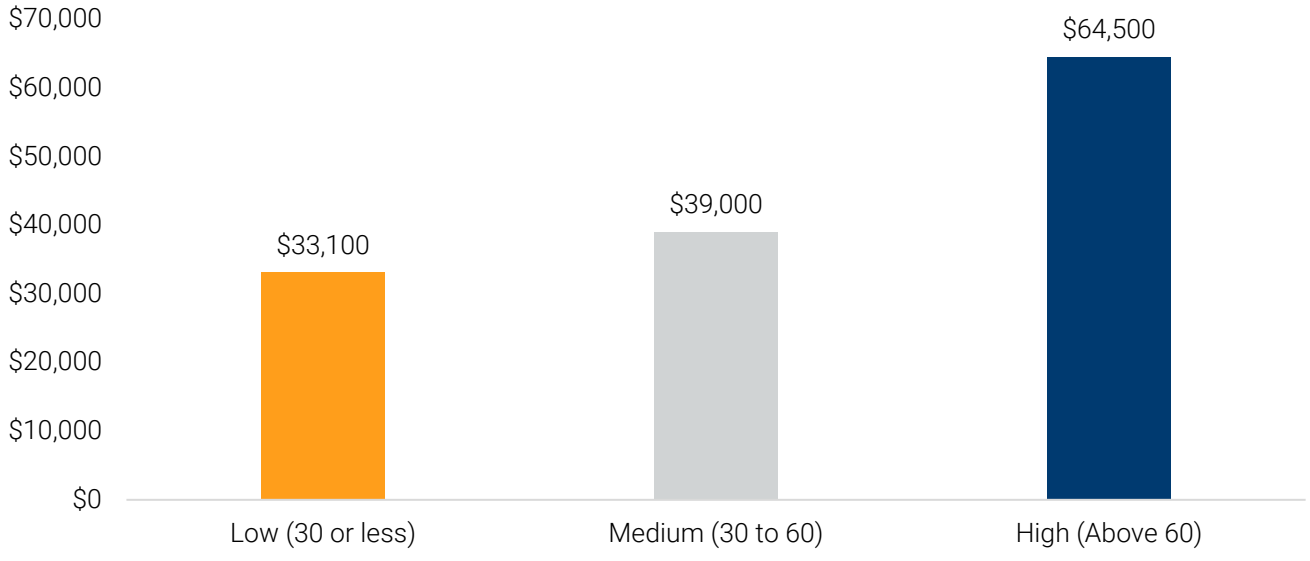
Brookings data on the "digitalization" of work for this report documents that the more digital the occupations in a firm, industry, or place are, the more productive and high-paying they are.[43] Hoosiers in highly digital jobs, in aggregate, make more than twice as much as those in less digital positions.

So it's a good thing that the digitalization of Indiana jobs has been increasing in recent years, to the point that more than 32% of Hoosiers now work in jobs with "high" digital score (up from 30% in 2012), while nearly 60% work in jobs with "medium" digital score (up from 53.5% in 2012). Such figures confirm that Indiana's industries and firms are steadily upgrading their tools and processes.

That being said, Indiana's digital gains remain only modest compared to other states. Overall, Indiana's relatively low mean digital score and middling 3-point overall score increase for the years 2012 to 2019 reflect only a 2.1% increase in the state's highly digital-

Figure 40. Hoosiers in highly digital jobs, in aggregate, make more than twice as much as those in less digital positions

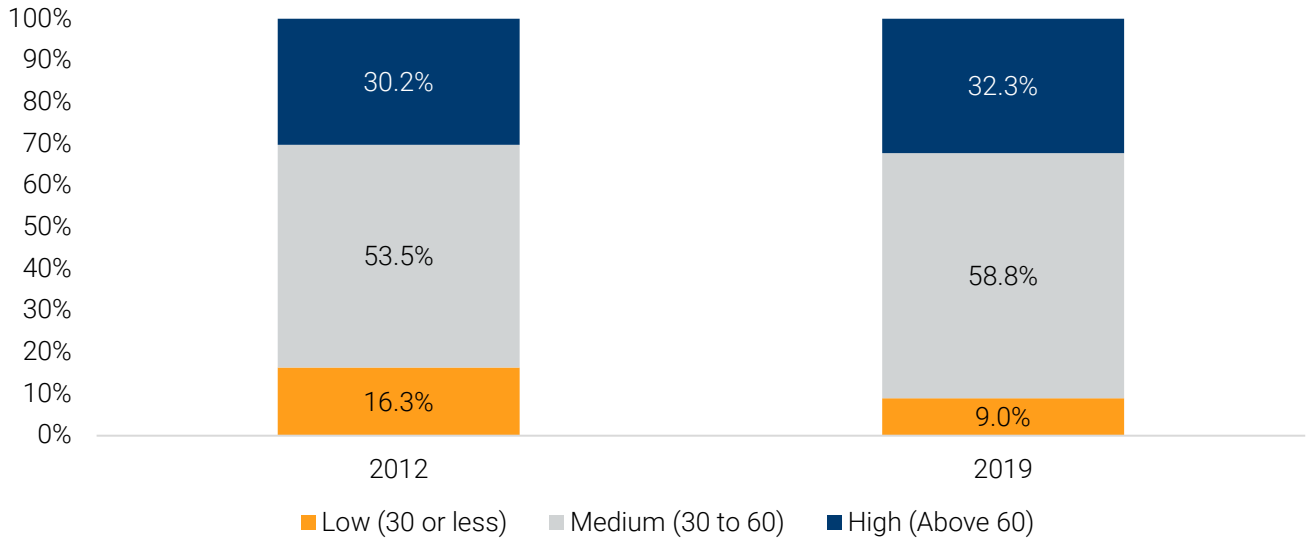
Average annual wages by digital score in Indiana, 2019



*Source: Brookings analysis of BLS and O*NET data.*

Figure 41. The digital content of Indiana employment is increasing at a moderate rate

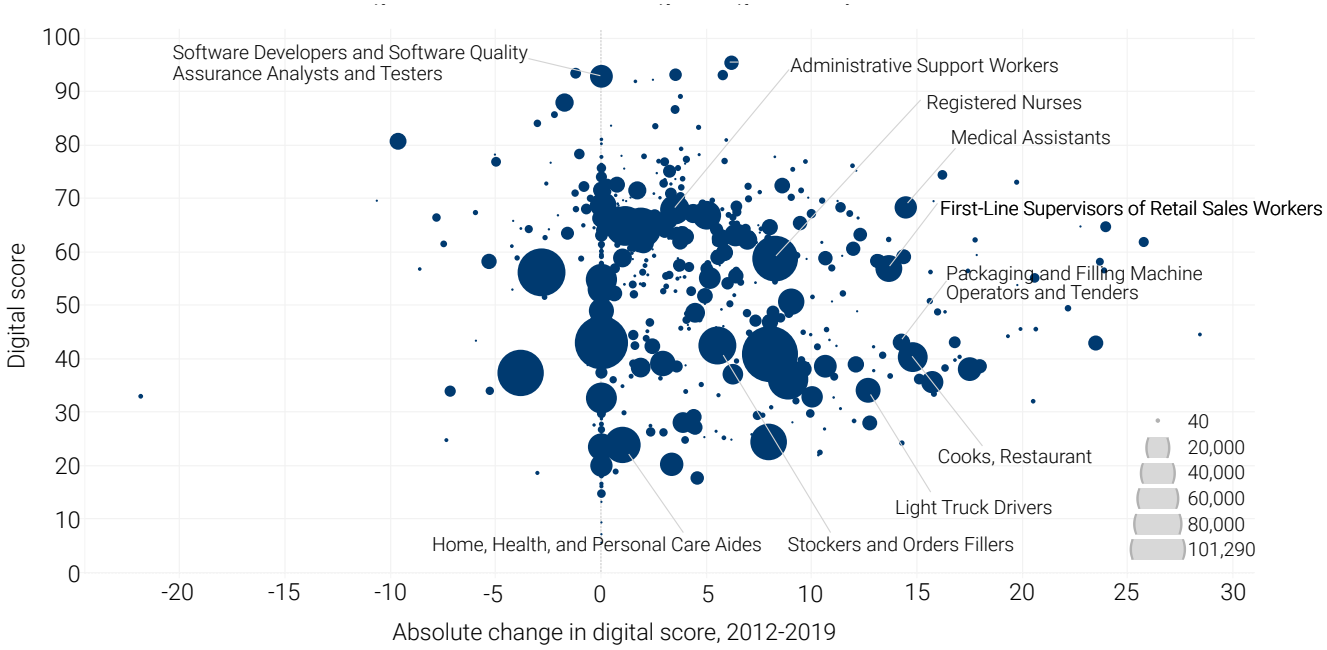
Share of employment by digital score in Indiana, 2012-2019



*Source: Brookings analysis of BLS and O*NET data.*

Figure 42. The digital-skills requirements of many occupations rose—often rapidly—between 2012 and 2019

Digital skills levels and change in digital skills, 2012-2019



Note: Bubble size represent employment by detailed occupation in Indiana in 2019. Occupations with recent negative values following earlier surges since 2002 are not displayed.

*Source: Brookings analysis of O*NET and BLS data.*

jobs cadre—an increase far slower than states such as Massachusetts or Kansas. What's more, the mean digital score of a "good job" as defined by Brookings increased by just 2 points from 2012 to 2019 in Indiana, from 54 to 56. Good jobs, in short, were becoming more digital—a good thing portending increased pay, but still happening at a slower pace than elsewhere, including in some of Indiana's peer states. Given that, accelerating digitalization at the occupational level remains another key priority—not just for increasing productivity in the abstract but more specifically for ensuring the possibility of pay and work quality increases in specific medium- and lower-pay jobs.

And here, the job-level facts of digitalization trends underscore that to fully reap the benefits of increased digitalization, the state is going to need to help more Hoosiers obtain more digital skills as the economy continues to change. To show this, Brookings analyzed the pace of digital-skill change in 702 Indiana occupations by looking at occupations' changing digital scores between 2012 and 2019. In doing this, it becomes easy to see that even Indiana's relatively sluggish topline digitalization pace masks significant change.

Table 9. Numerous important occupations—including in health, fulfillment, or retail and administrative supervising—have seen their digital content rise

Change in digital score by occupation, 2012-2019

Occupation	Mean annual wage, 2019, Indiana	Digital score, 2012	Digital score, 2019	Score change, 2012-2019
Network and Computer Systems Administrators	$79,070	89	96	7
Software Developers and Software Quality Assurance Analysts and Testers	$91,880	93	93	0
First-Line Supervisors of Office and Administrative Support Workers	$57,380	65	68	3
Medical assistants	$34,050	54	68	14
Registered Nurses	$66,560	51	59	8
First-Line Supervisors of Retail Sales Workers	$41,920	43	57	14
Stockers and order fillers	$28,130	37	43	6
Packaging and Filling Machine Operators and Tenders	$34,240	29	43	14
Cooks, Restaurant	$25,250	26	40	14
Light truck drivers	$35,230	22	34	12
Home Health and Personal Care Aides	$24,100	23	24	1

Note: Occupations ranked by mean digital score in 2019.
*Source: Brookings analysis of BLS and O*NET data.*

Looking broadly across the labor market, the aggregate digitalization score across all occupations rose from 51 in 2012 to 54 in 2019, reflecting a 5.8% increase. In total, digitalization was rising in 375 out of 672 analyzed occupations, including some (though not all) higher-score technology occupations that began with high digital ratings.

Yet what is most striking is that while the digitalization of many jobs was continuing to rise in the last decade after similar surges in the 2000s, much of the fastest change is occurring in the middle and low end of the skill-pay distribution. Occupations ranging from medical assistance and nursing positions to retail supervisors, light-truck drivers, and fulfillment workers have all seen rapid transformation. Even cooks and truck drivers have seen the digital demands of their roles increase by 14 and 9 points, respectively, since 2012.

In sum, Indiana policymakers and employers need to redouble their support for the development of digital skills as a key strategy for reanimating the state's economy. Prioritizing digital adoption in the state's industries and enterprises will absolutely demand equivalent investments in digital literacy and upskilling to maximize the impact of the new technologies and ensure Hoosier workers benefit from it.

Gaping broadband connectivity gaps are holding Indiana back

The final digital challenge is the fact that the COVID-19 pandemic has laid bare stark digital connectivity divides in Indiana and elsewhere, with concerning implications. To be sure, it has long been recognized that the internet delivers critical economic benefits in a digital economy, since it accelerates learning, enables employers and job seekers to find each other, and helps firms reap productivity gains.[44] In that sense, broadband is a crucial element of digital adoption and downstream productivity gains, including as a facilitator of labor-market matching.[45]

Yet in the COVID-19 era, digital connectivity is not just an upgrade for work and the economy, but a lifeline to them.

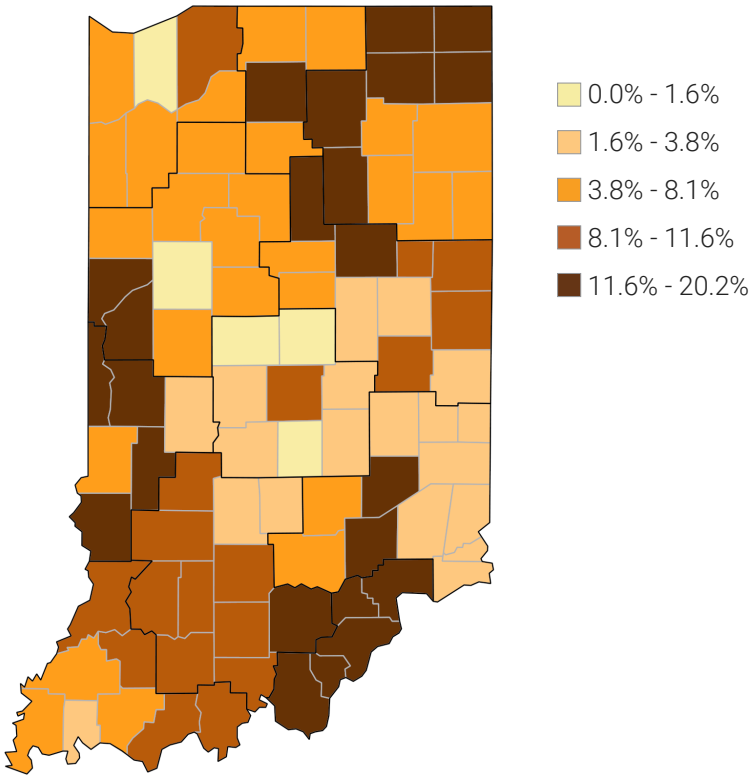
For example, gaps in internet access at a moment of increased e-learning during the pandemic have undermined education access for thousands of Hoosier families and students. Nor is the problem anecdotal: Last summer, compelling research from Ball State University's Center for Business and Economic Research estimated that some 42,413 Hoosier households with school-age children—about 6.5% of them—lack a dial-up internet subscription or broadband access at home.[46] This research, displayed in Map 6, shows that Indiana's Southern, Northeastern, and West Central regions have the highest shares of households with school-age children that lack internet. Overall, the Ball State analysis implies that some 69,000 to 84,000 school-age children have missed or may still be lacking access to online school lessons.

Data from the Census Bureau's American Community Survey (ACS) suggests the problem may be even more severe. When only fixed, wireline broadband is counted (given that that's the preferred platform for remote learning), some 181,000 households with school-age children—or 26% of all such households in the state—lack access.[47] Building on those numbers, Brookings calculates that as many as 213,000 school-age children in Indiana may have been without wireline broadband access during the pandemic.[48]

Making all of this especially worrisome, meanwhile, is the fact that the state's combination of increased remote instruction and spotty broadband access is likely disproportionately affecting students in families with characteristics that already impede academic success. Specifically, the Ball State researchers document that single-parent households, households with parents not in the workforce, low-income households, and households that do not speak English at home are all far less likely to have internet access at home.[49] Such gaps and disparities have large implications for the education and inclusivity of Indiana's future workforce.

Beyond that, the larger issue is that too many Indiana households—with or without kids at home—live without a broadband subscription, meaning that today's digital economy is out of reach for them. To be sure, Indiana's broadband adoption rate has increased from 60% to 65% since 2013. However, that 65% rate remains in the fourth quintile of states—a concern that has been highlighted by the pandemic recession.

Map 6. In much of the state, large shares of households with school-age children lack a dial-up internet subscription or broadband access at home
Share of households with children but no internet access in Indiana, 2018



Source: Brookings analysis of Ball State University data.

And that is the aggregate. Look more closely, and it is clear the state—like others—struggles with both rural and urban access and adoption challenges. Rural and small-town "micropolitan" counties, for their part, have five-year average adoption rates of 48% and 53%, respectively. Because of their thin populations, such nonurban counties raise serious issues given their pervasive connection and adoption problems, but account for only about 29% (or 293,000) of the state's households without broadband.

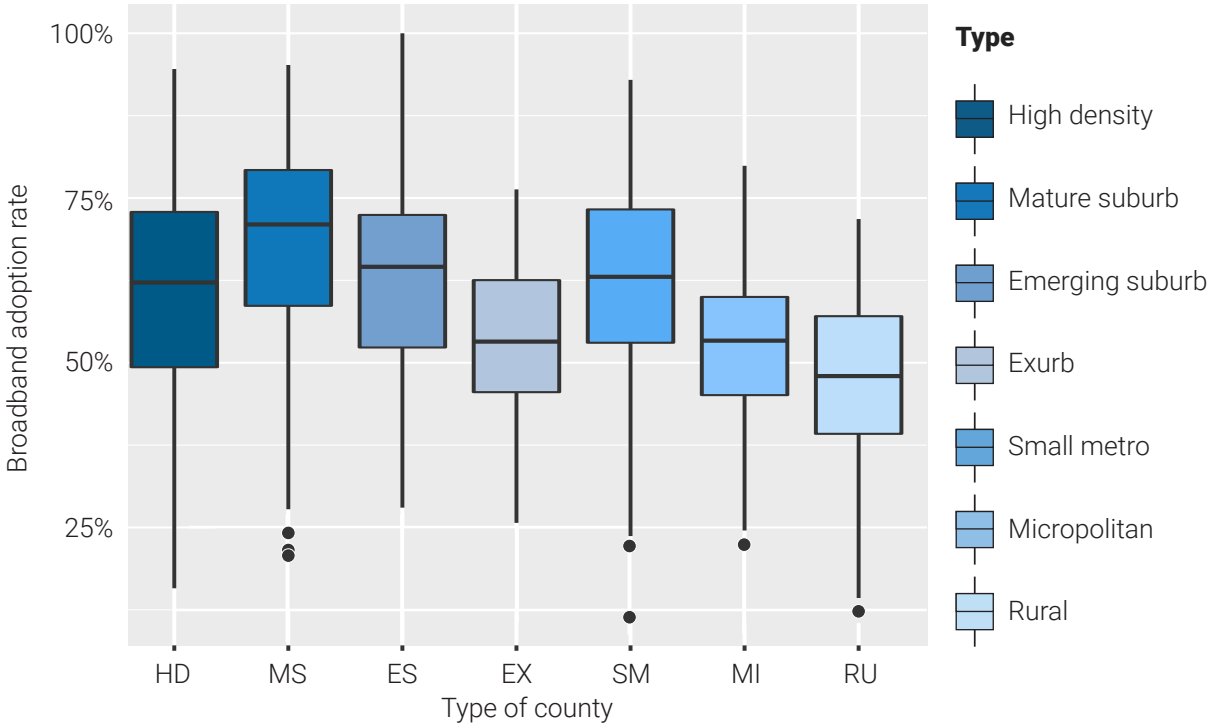
By contrast, high-density urban and mature suburban counties have adoption rates right at or above the state's five-year average of 63%—at 63% and 73%, respectively. But these counties also have the most neighborhood variance of any type. As a result, these denser urban and suburban counties account for 35% (or 337,000) of the state's households without broadband.

So, while it is the digital divide between rural and urban places that garners the most attention, Indiana contends with broadband gaps of both types. And, unsurprisingly, those divides and the disparities within them align with and exacerbate income and demographic vulnerabilities in both types of community.

Most notably, three times the share of households with incomes of less than $25,000 a year—57% of them—lack broadband as those earning more than $100,000. Likewise, renters are much more likely to go without broadband than homeowners, by a gap of 45% versus 31%. Between 2013 and 2018, broadband subscription

Figure 43. Broadband adoption rates vary across Indiana community types

Broadband adoption rate across Indiana tracts, 2018

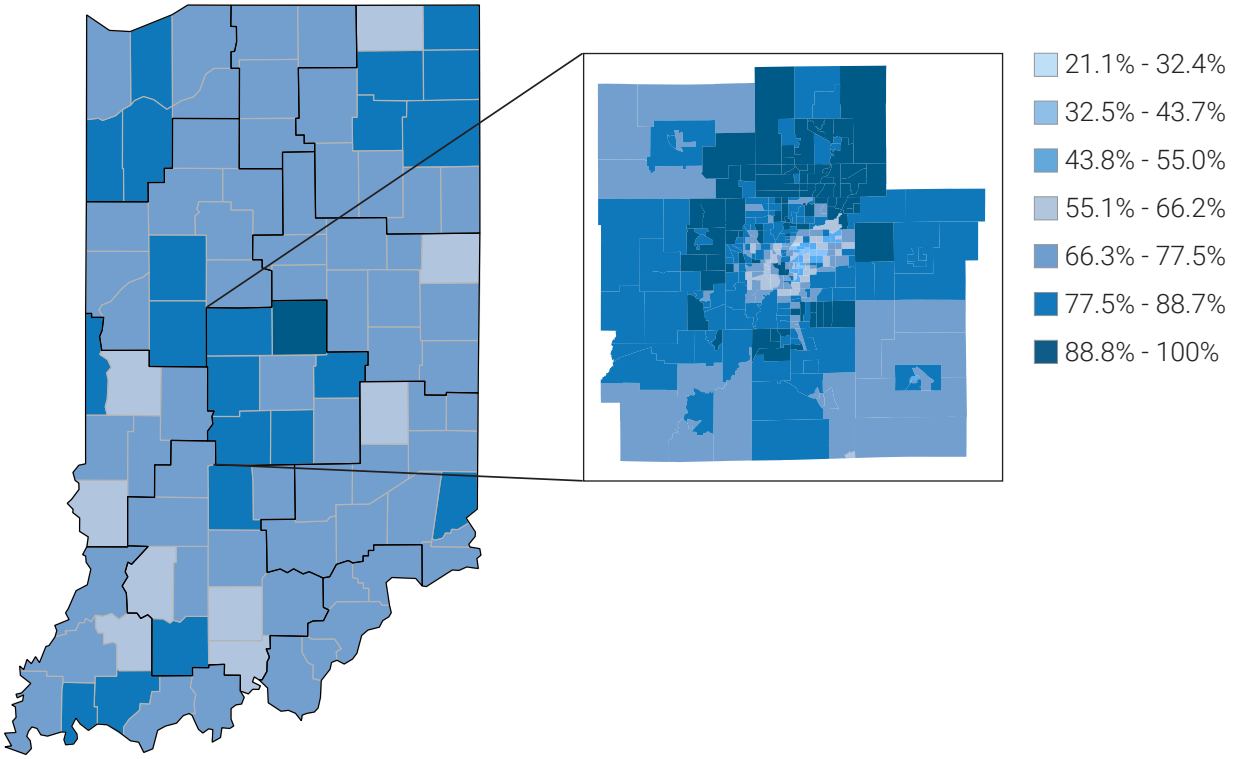


Source: Brookings analysis of Census data.

in households with incomes between $25,000 and $50,000 did not grow fast enough to meaningfully narrow the gap: The rate grew only a single point faster than the state average. In sum, the state's patchwork broadband coverage—compounded by adoption issues, subscription and device affordability, and the need for digital skills—is likely contributing not just to education and economic connection issues, but to larger issues of basic equity.

While it is the digital divide between rural and urban places that garners the most attention, Indiana contends with broadband gaps of both types. And, unsurprisingly, those divides and the disparities within them align with and exacerbate income and demographic vulnerabilities in both types of community.

Map 7. Census-tract analysis confirms that broadband access varies between counties, and also within them.
Share of households with broadband in Indiana and in Central Indiana, 2014-2018



Source: Brookings analysis of IPUMS USA data.

CHALLENGE #2: PANDEMIC-DRIVEN JOB SHORTAGES AND LONGER-TERM SKILL AND MATCHING CHALLENGES COMPLICATE WORKER TRANSITIONS

Looking closer at the state's reallocation and worker transitions suggests the need for several types of response. Facilitating favorable worker transitions—say, from a lost job or precarious industry to new or better ones—will remain challenging for months or even years, for two reasons:

- The state faces a shortage of jobs of all types due to the COVID-19 recession
- Multiple skills and matching challenges complicate workers' transitions

Indiana faces a shortage of jobs of all types due to the COVID-19 recession

A decade of expansion in the wake of the Great Recession helped Indiana approach full employment by the late 2010s, resulting in a historically low unemployment rate and modest wage gains for workers. While the number of good jobs in the state remained too few, there was a foundation to build on amid plentiful opportunities.

However, the COVID-19 recession wiped out many of those gains. And while Indiana has had a relatively fast recovery compared to other states, it nonetheless still faces short- and medium-term labor market challenges.

Overall, the state—recently job-rich—is contending with

Table 10. Uneven patterns of job losses and gains in the pandemic and recovery represent complications for worker adjustment to new conditions

Change in total employment by industry in Indiana, not seasonally adjusted, February - November 2020

Industry	February	November	Employment change, Feb – Nov 2020	Percent change, Feb – Nov 2020
Manufacturing	532,900	501,000	-31,900	-6.0%
Government Edu Services*	243,700	229,000	-14,700	-6.0%
Health Care-Social Assistance	420,700	406,300	-14,400	-3.4%
Accommodation and Food	263,800	251,200	-12,600	-4.8%
Educational Services	70,200	62,500	-7,700	-11.0%
Other Services	133,400	127,700	-5,700	-4.3%
Scientific and Tech Services	126,800	121,600	-5,200	-4.1%
Wholesale	121,700	116,500	-5,200	-4.3%
Information	28,400	24,800	-3,600	-12.7%
Real Estate	35,600	34,000	-1,600	-4.5%
Utilities	13,700	13,500	-200	-1.5%
Government excl. Edu**	198,000	197,800	-200	-0.1%
Management	34,200	34,200	0	0.0%
Mining	5,500	5,500	0	0.0%
Arts and Entertainment	36,400	36,700	300	0.8%
Finance	106,400	106,800	400	0.4%
Retail	310,600	313,200	2,600	0.8%
Transportation	145,600	155,700	10,100	6.9%
Construction	140,500	152,200	11,700	8.3%
Administrative Services	171,800	197,600	25,800	15.0%
Indiana (Total private)	**2,698,200**	**2,661,000**	**-37,200**	**-1.4%**
Indiana (Total nonfarm)	**3,139,900**	**3,087,800**	**-52,100**	**-1.7%**

*Note: *Government Educational Services include workers in State Government Educational Services and Local Government Educational Services.*

***Government Excluding Educational Services includes Federal, State, and Local Government employees, excluding state and local schools.*

November data is preliminary estimates.

Source: Brookings analysis of BLS data

a thinner supply of jobs of all types and fewer openings for job seekers. To be sure, the state's economy had by November 2020 recouped nearly 87% of the jobs it lost between February and April. But even so, Indiana's total November employment was still 52,000 positions lower than its February 2020 level.

What's more, particular features of the pandemic job shortage have exacerbated the state's labor market challenges. The net loss of 32,000 manufacturing jobs since the crisis broke, to begin with, is a loss of thousands of what are frequently "good" jobs that are relatively good-paying, accessible to workers without a B.A., and well distributed around the state. At the same time, the state's sizable losses of jobs in accommodation and food service (12,600 positions), and in health care and social assistance (14,400 positions), are also problematic, as such positions are often mainstays of connection to the economy for young, less educated, or underrepresented workers, including women.

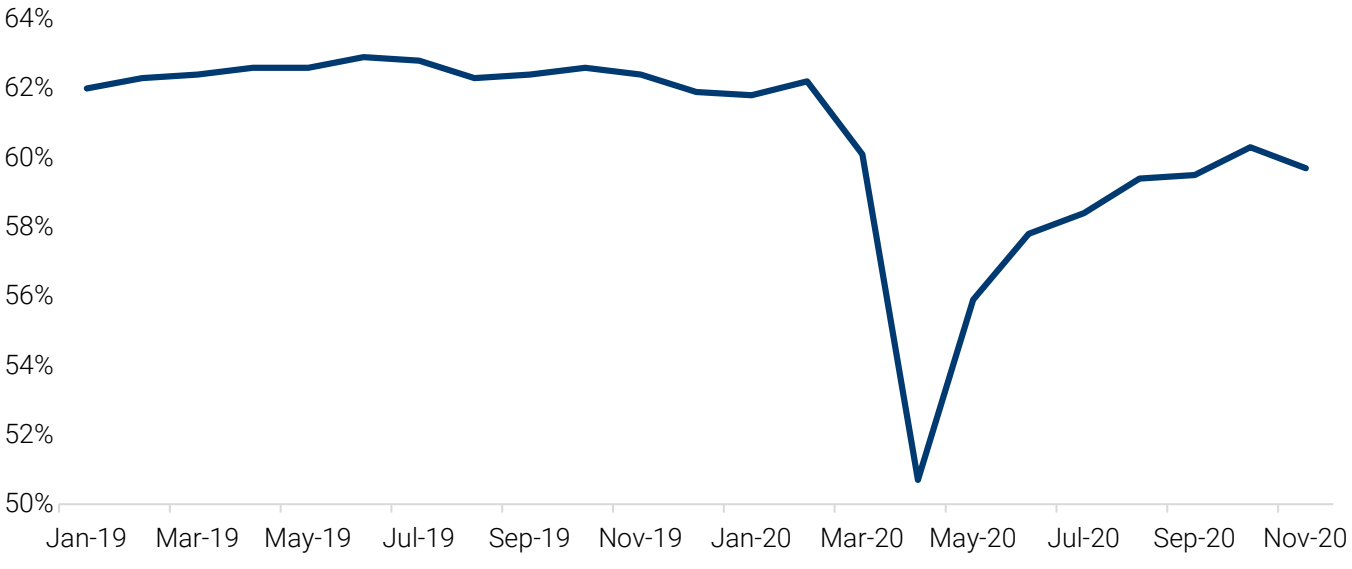
Other measures also suggest that the year's lingering job losses could remain a problem for worker reconnection and adjustment in the coming year.

The state's improved unemployment rate, for example—which has dropped from a historic high of 16.9% in April 2020 (the fifth-highest rate in the nation) to below 5% by November (the 15th-lowest)—nevertheless masks continued softness and unevenness in the labor market. For one thing, the unemployment rate varies widely across regions: While the **Wabash Heartland** region registered a November unemployment rate of just 4%, **Northern** and **Northwest Indiana**—which saw unemployment rates of 23.6% and 19.6%, respectively, in April—registered much improved but still elevated rates of 5.1% and 6.3% in November.

Also troubling is the fact that the state's unemployment rate reduction has likely come partly from workers dropping out of the labor force. Some of these individuals may be workers who have grown discouraged and given up looking for work altogether—a serious problem in its own right.[50] At the same time, many of the jobless may be women dropping out of the labor force because they cannot access child care, which is frequently unavailable.[51]

Figure 44. The employment-to-population ratio has been recovering, though more slowly in the fall

Employment to population ratio in Indiana, not seasonally adjusted, January 2019 - November 2020



Note: November data is a preliminary estimate.
Source: Brookings analysis of BLS data.

Even before the COVID-19 crisis, over half of Indiana families lived in a child care "desert," which the Center for American Progress defines as "any census tract with more than 50 children under age 5 that contains either no child care providers or so few options that there are more than three times as many children as licensed child care slots."[52] In Indiana, 46% of urban, 48% of suburban, and 72% of rural families reside in such a tract. And even in places with child care options, it is expensive: The average cost of child care in Indiana is $12,612 per year ($1,051 per month), more than the average cost of in-state college tuition.[53] Since the crisis began, these child care problems have reached an emergency level, with the burden falling disproportionately on women.[54]

Individuals who drop out of the labor force, however, are not counted in the state's unemployment rate calculation, meaning that the unemployment rate largely leaves them out of the picture. Therefore, a more useful indicator during times of economic turbulence—when the number of people with jobs remains depressed and some job seekers are dropping out of the labor force entirely—is the state's employment-to-population (EPOP) ratio. This measures the ratio of a location's employed residents to the total working-age population, showing the share of the state's working-age population who have or do not have a job, regardless of whether or not they are actively looking for work. This metric combines the best elements of the unemployment rate measure with those of the labor force participation rate.

What does the EPOP ratio for Indiana say? The data shows that Indiana's EPOP ratio plunged from 61.8% in January to 50.7% in April, before reaching 60% in October and then slipping back to a still-weakened 59.7% in November. This is in contrast to the previous 12 months, when the EPOP ratio hovered fairly steadily around 62%. So, while the unemployment rate paints a fairly positive picture of Indiana recovery, scrutinizing the numbers shows that over 2% of Indiana workers—equivalent to more than 50,000 people—who had jobs in February 2020 remain out of work and potentially out of the workforce entirely.

This near-term shortage of work also means that some workers are being forced into part-time arrangements even when they'd prefer to work full time. The incidence of involuntary part-time work in Indiana has increased by 57%—or over 40,000 workers—from the four-quarter average ending in the fourth quarter of 2019 to the one ending in the third quarter of 2020.[55]

So, with fewer jobs to go around (at least for now), the state must contend with ongoing labor market imbalances and overall higher chances that many workers will struggle to locate work. A late-2021 economic surge may help such workers, but pockets of stress will likely remain. What's more, such softness in the labor market can be self-perpetuating, to the extent that reduced consumer spending depresses economic activity and, in turn, hiring.

But Indiana faces additional uncertainties about its overall job availability. For example, trade and technology benefit the state by fostering innovation and productivity, but each has had (and will continue to have) disruptive effects on the labor market.

In the case of trade, 1980s-era globalization followed by China's accession to the World Trade Organization in 2001 subjected much of the U.S. to increases in import competition that forced firms to cut production costs, including U.S. workers.[56] For Indiana—with its heavy manufacturing focus—this has brought inordinate impacts, with ramifications for employment levels and the labor market. In this fashion, a Brookings analysis of data from David Autor, David Dorn, and Gordon Hanson suggests that import competition from China alone imposed a 4.2% decline in employment for Hoosiers between 1990 and 2007, due to job loss in the manufacturing sector.[57] Similarly, an analysis from the Economic Policy Institute estimates that the nation's overall goods trade deficit with China displaced 86,000 Hoosier jobs between 2001 and 2018 to drive a net 2.9% decline in Indiana employment.[58] Overall, employment has fallen in U.S. industries exposed to heavy import competition, while employment gains in other industries have been slow to materialize.[59]

Technology in the form of automation is likely having similar and perhaps broader effects even as it contributes to Indiana productivity.[60] No state has a higher share of its jobs in occupations highly susceptible to automation, meaning jobs in which 70% or more of the occupation's tasks are classified as "routine" or "repetitive," and thereby automatable with current

Table 11. Some of Indiana's most sizable mainstay occupations have especially high susceptibility to automation-driven disruption

Automation potential by industry group

Industrial family	Automation potential
Accommodations and Food Services	73%
Manufacturing	59%
Transportation and Warehousing	58%
Agriculture, Forestry, Fishing and Hunting	57%
Retail Trade	53%
Mining, Quarrying, and Oil and Gas Extraction	51%
Other Services (except Public Administration)	49%
Construction	47%
Wholesale Trade	44%
Utilities	43%
Finance and Insurance	42%
Arts, Entertainment, and Recreation	41%
Administrative Services	41%
Real Estate and Rental and Leasing	40%
Government	37%
Health Care and Social Assistance	36%
Information	35%
Management of Companies and Enterprises	34%
Professional, Scientific, and Technical Services	34%
Educational Services	27%
U.S. total	**46%**

Source: Brookings analysis of BLS, Census, EMSI, Moody's Analytics, and McKinsey data.

technology. This doesn't mean that tens of thousands of jobs will immediately disappear, but it does mean that 900,000 jobs—or 29% of the state's job base, according to Brookings analysis for this report—could face significant reorganization or dislocation through the adoption of automation in the coming years.[61]

Three of the industries that have already been hit hardest by pandemic-related job losses—accommodation and food services, manufacturing, and retail—are also three of the most automation-susceptible. In this regard, the state's high exposure to automation (given its occupational mix) represents a possible additional headwind in the face of the robust job creation needed for a solid recovery. While automation supports productivity, it may also reorient or restrain hiring, or otherwise require worker readjustment.

What's more, the COVID-19 recession and its aftermath are likely bringing *more*, not less, automation to Indiana, alongside both potential productivity improvements and further worker displacement.[62] This likelihood partly reflects recent quality and price improvements in the technology, as well as today's fears of infection and the necessity of social distancing. Greater adoption of automation technologies—which includes digital adoption—is a positive development for some workers in that it will boost productivity, and in the process help workers who remain on the job. But the likely automation surge also reflects the deeper fact that in the wake of an economic shock, human labor becomes relatively more expensive as firms' revenues sag.

In this vein, several careful studies based on the last three recessions reinforce the fact that new bouts of recession-linked automation will likely further depress the state's supply of jobs in the next couple years.[63] In one of the papers, by Brad Hershbein and Lisa Kahn, an analysis of almost 100 million online job postings before and after the Great Recession found that firms in the hardest-hit metro areas tended to restructure their production the most heavily toward greater use of machines. Today, with COVID-19 stressing the economy, more firms will likely adopt more digital and other automating technologies. As they do so, their technology adoption could well help rejuvenate Indiana's sagging productivity, but also further weaken the state's supply of middle-wage jobs.

There is one more challenge to the state's return to job density: Future economic prospects may also suffer from a shortage of entrepreneurship—a major source of attainable employment and reemployment in many regions.

The formation of new firms is an important source of jobs in recoveries.[64] As such, entrepreneurship—the propensity to start and grow new business enterprises—can help labor markets work through job shortages while also serving as an important source of adaptive change. However, Indiana is short on entrepreneurship. Historically, the state has made do with smaller-than-average shares of its workers in young businesses. Nationwide, 36% of firms are five years old or younger, and these firms account for over 10% of U.S. employment. However, in Indiana, just 30% of firms are five years old or younger, and these firms account for less than 8% of jobs in the state. Indiana also ranks fourth among six peer states with data available, lagging Tennessee, Illinois, and Michigan, but ahead of Ohio and Wisconsin, in both overall share of young firms and share of jobs at young firms. Relatedly, new research from EIG developed for the GPS Project finds that Indiana ranks 39th among all states and Washington, D.C. for share of jobs at new firms.[65]

At the same time, Indiana has an unusually high share of its jobs in the *oldest* firms in the state. Nearly 40% of employer firms in Indiana are 16 years old or older, employing over 80% of the state's workforce. (Nationally, just 31% of firms are 16 years old or older, with such firms employing less than 74% of workers.) In fact, Indiana has more employer firms that are 16 years old or older than it has firms younger than five years old—a trend that runs opposite to the country as a whole, indicating a relative lack of dynamism in the state. As a result, EIG notes that Indiana has the third-highest share in the country of jobs at very old (and often larger) firms—a trait that reduces its population of young, small, dynamic firms.[66]

Meanwhile, in the absence of vigorous policy action, ongoing demographic trends may be worsening this lack of economic dynamism. As recent research for this project from AEI's Lyman Stone has noted, Indiana's declining working-age population could exacerbate issues related to startup capital and business dynamism in the state in the coming decades.[67] Likewise, shortages of entrepreneurship may also become a self-reinforcing dynamic that reduces the state's attraction to migrants.

Finally, while minorities make up 21% of Indiana's population, minority small business owners represented only 16% of the state's businesses and 12% of the state's young businesses (in operation for fewer than two years) in 2017. These disparities are particularly stark for Black business owners: Black Hoosiers own businesses at just 15% of the rate of their overall share of Indiana's population, which ranks Indiana 26th out of the 40 states (including Washington, D.C.) with data available. Cities within Indiana likewise lag their peers in minority small business ownership. For example, among the 85 largest U.S. metro areas with data available on the racial breakdown of business ownership, Indianapolis ranks 55th, with minorities accounting for 26.2% of the region's population but only 8.9% of its owners of businesses with employees.[68]

In sum, Indiana's job and readjustment challenge is complicated by its thinner-than-average presence of job-creating small and new firms. That means the state is missing an important, accessible source of potential new employment at a moment when its mainstay employment sectors such as food and accommodation and health are diminished.

Eventually, COVID-19's employment disruptions will ease, and the state will again have an adequate number of jobs. But for now, it's short of them, and many of the jobs it does have may look different from those it had in early 2020—a result of the job destruction and industry restructuring caused by the COVID-19 recession, as well as the ongoing effects of automation, globalization, and other trends. In this regard, the state must aim to not only create jobs, but to ensure that workers have the means to access them.

Multiple skills and matching challenges complicate workers' transitions

Indiana's readjustment challenge goes beyond the broad availability of work, however. Equally challenging is that the state—like others—will be dealing for some time with labor market imbalances, dislocations, and disconnects

that will complicate the readjustment of workers as they seek new work. These dynamics complicate the reallocation process.

Beyond the most glaring imbalance—the one between the 388,500 jobs that were erased by the initial COVID-19 crisis and the 336,400 jobs that have been recreated since then—several other asymmetries point to possible structural changes in the labor market.

For one, the existing misalignment in Indiana between firms' demand for skilled talent and the availability of that talent will likely be exacerbated by the pandemic, which has seemed to favor workers with better educations. Even before the crisis, 33.5% of Indiana jobs required postsecondary education, but only 25.9% of the state's 4.4 million working-age adults had the requisite level of education.[69] That misalignment could widen if firms increase their demand for skilled talent as they restore staff, as some research suggests they will. The struggles of workers and firms could also widen in such a scenario if young Hoosiers continue to believe that a high school diploma is enough for success in life, as the AEI survey conducted for this project suggests they do.[70]

Likewise, remote work is emerging as a new fault line. Brookings analysis, informed by recent research from Jonathan Dingel and Brent Neiman, concludes that about 30% of Indiana jobs can reasonably be performed from home.[71] That reality has been a boon for some but a challenge for others. On the one hand, Brookings finds that Indiana workers in occupations that can be performed from home have been better able to adjust to the crisis (so long as they could secure child care). These workers have been more likely to retain their jobs during the pandemic and typically receive higher pay. They are also more likely to be white, have a college degree, and work in occupations with high digitalization.[72]

On the other hand, the 70% of Hoosiers in occupations that cannot be performed from home are more economically vulnerable. As a group, these workers have been less likely to be working, less well-paid, less likely to have a college degree, more likely to be renters, and more likely to be nonwhite. These less fortunate workers are also less likely to work in occupations that require higher levels of digital skills. Given the high digitalization of most occupations that can be performed from home

Table 12. Occupational groups vary widely in the extent to which they can be done from home, pointing to differences in Hoosiers' ability to work at all

Share of "teleworkable" jobs by occupation group

Occupation group	Share of "teleworkable" jobs
Computer and Mathematical	100%
Education, Training, and Library	99%
Legal	95%
Business and Finance Operations	89%
Management	88%
Arts, Design, Entertainment, Sports, and Media	82%
Office and Administrative Support	75%
Personal Care and Service	41%
Life, Physical, and Social Science	39%
Architecture and Engineering	38%
Community and Social Services	24%
Sales and Related	23%
Transportation and Material Moving	4%
Healthcare Practitioners and Technical	2%
Healthcare Support	2%
Protective Service	2%
Farming, Fishing, and Forestry	1%
Installation, Maintenance, and Repair	1%
Production	1%
Food Preparation and Serving Related	0%
Building and Grounds Cleaning and Maintenance	0%
Construction and Extraction	0%

Source: Brookings analysis of BLS, Emsi, and Dingel and Neiman (2020) data.

Table 13. The ability to work at home has been a significant factor of economic adjustment, and aligns with sharp economic and demographic divides

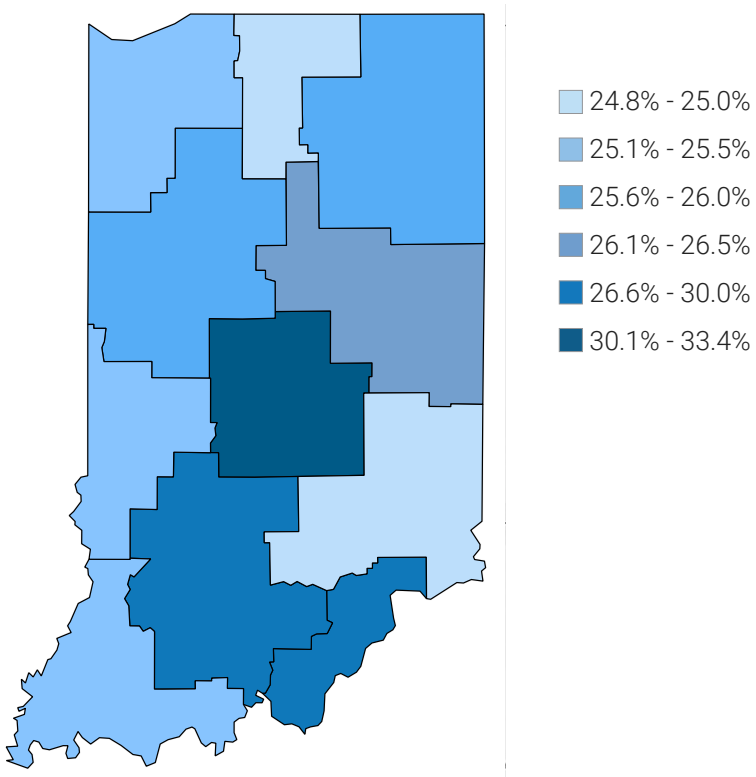
Ability to work from home by demographic groups in Indiana

	Can work from home	Cannot work from home
Mean annual earnings	$60,600	$38,700
BA+ share*	51%	18%
Mean digital score	53	31
Non-white share	14%	21%
Access to employer-sponsored health insurance**	81%	66%
Unemployment (based on June 2020 data)	11.1%	11.3%
Unemployment (based on April 2020 data)	14.0%	15.9%

*Note: *Based on national estimates of educational attainment by detailed occupation*
***Based on national estimates of access to employer-sponsored health insurance by major occupation group*
Source: Brookings analysis of BLS, Emsi, and Dingel and Neiman (2020) data.

Map 8. The state's variegated industry and occupational map implies varied ability by workers to engage in work remotely

Share of jobs that can be done from home



Source: Brookings analysis of BLS, Emsi, and Dingel and Neiman (2020) data.

and the technical skills required to work remotely, therefore, Hoosiers lacking digital skills may experience added difficulty finding work in an economy increasingly driven by remote work. The upshot: the expansion of remote work represents a new hurdle to worker adjustment. That 70% of Hoosier workers cannot work from home given their occupation creates a new barrier to resilience.[73]

Automation poses similar adjustment challenges. After all, to the extent the COVID-19 recession is prompting more automation, it could be creating additional imbalances that workforce policy will need to address.

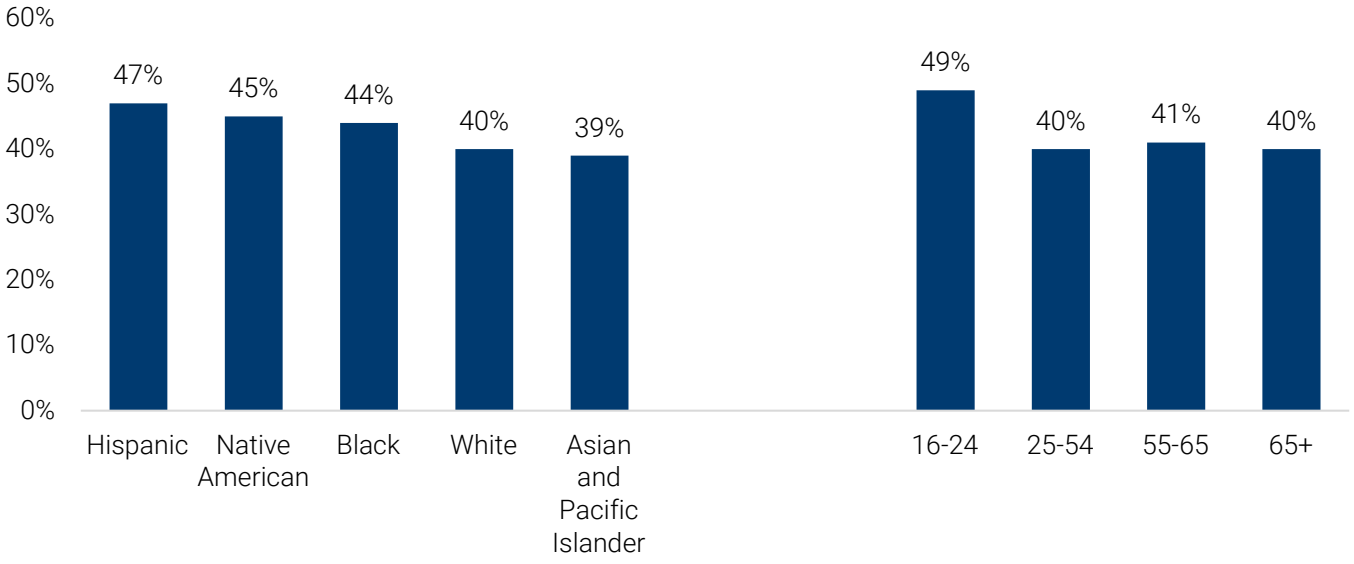
For one thing, any reduction of job density in automation-susceptible fields and industries will contribute to Indiana's challenges by reducing rehiring in mainstay industries—thereby requiring other fields to pick up the slack. For example, reduced rehiring in the automation-susceptible hospitality, manufacturing, and retail sectors—which account for about 1 million Hoosier jobs—could force more workers into more challenging rehiring journeys.

Even more concerning, the coincidence of automation vulnerability with broader economic vulnerability ensures that machines will exacerbate the inherent difficulties of helping those with limited skills transition to new roles, occupations, or industries. To this point, Brookings research documents that the automation vulnerability of a worker's job is highly correlated with lower education levels, lower digital skills, youth, and minority status. That means that a pandemic-driven automation surge would disproportionately complicate the reemployment of Indiana's most vulnerable workers.

Hershbein and Kahn, moreover, make clear one other automation tendency. Through their study of 100 million job postings, they show that in the Great Recession and its aftermath, firms did not just install more machines. Rather, firms in hard-hit regions "upskilled," replacing workers that performed automatable "routine" tasks with a mix of technology and more skilled workers.[74] In short, firms in places like Indiana restructured their production to "hollow out" their hiring by employing a limited number of higher-skilled workers on the one hand, and releasing many more middle-skill workers into their regions' mass of displaced lower-skilled workers on the other. Today, further polarization of the labor market is likely occurring.

Figure 45. Automation exposure varies across demographic lines

Average automation potential by gender and race, 2016



Source: Brookings analysis of Census data.

CHALLENGE #3: INDIANA NEEDS TO PRODUCE MORE GOOD JOBS

Finally, when it comes to good jobs, Indiana has contended with a confluence of challenging economic trends and missed policy opportunities which has cut against the creation of quality employment. Two challenges warrant concern:

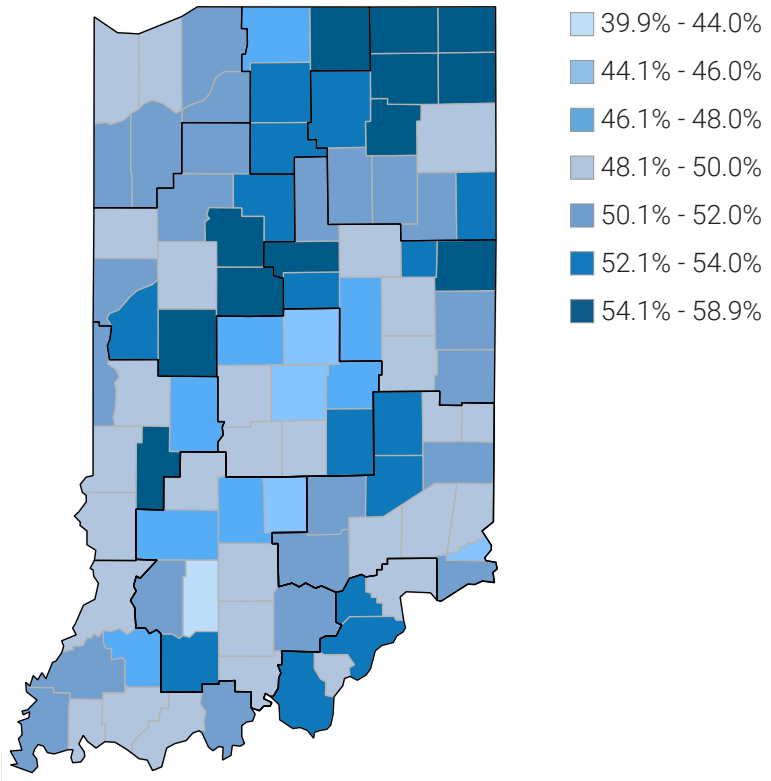
- Major economic trends and firm decisions have hollowed out Indiana's wage distribution
- Public policy has struggled to address market dynamics that have eroded job quality in many industries

Major economic trends and firm decisions have hollowed out Indiana's wage distribution

The interlinked trends of globalization and automation have constrained mid-level wage gains in Indiana more than in most places. Here, it bears saying again that trade and technology each bring substantial local benefits. But it is also true that they have almost certainly had negative wage effects on middle- and lower-skilled workers, in addition to their negative employment impacts. While increased trade, automation, and digitalization bring higher wages for workers that remain on the job, workers with fewer digital skills or who are outside of export-oriented

Map 9. The automation potential of work varies across the state but is highest across the northern tier

Automation potential by county, 2016



Source: Brookings analysis of BLS, Census Bureau, Emsi, Moody's Analytics, and McKinsey & Company data.

positions have lost out on such gains. Because of the significant concentration of economic shocks in Indiana over the past several decades, negative wage effects have been especially sharp in the state.

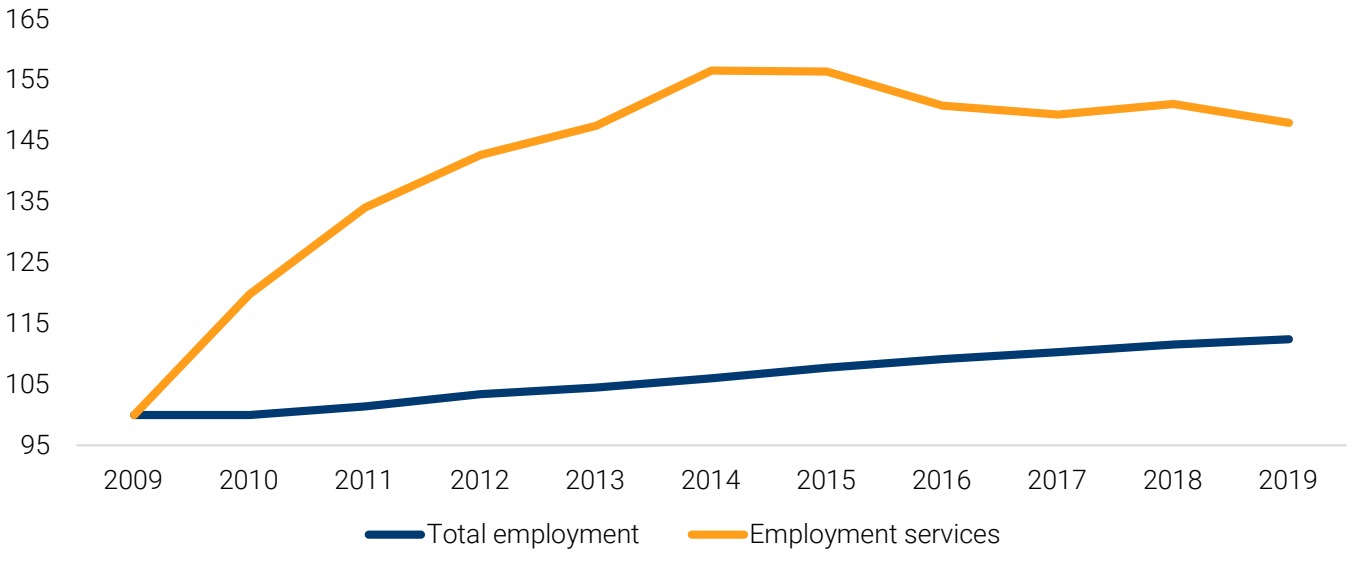
In the case of globalization, trade has inordinately exposed Indiana workers to downward pressures on wages by subjecting those in middle-wage jobs to new competition from both a global workforce and automation.[75] Indiana, because of its manufacturing-heavy industry mix, has been at the center of these impacts.

In this respect, a second Brookings analysis of data from Autor, Dorn, and Hanson suggests that local import competition from China alone not only eroded employment in Indiana, but also pushed down annual wages for Hoosiers by 3.8%—or approximately $1,440 per worker—between 1990 and 2007. That amounted to the largest rate of local wage decline due to Chinese imports in the Midwest, and the ninth-largest decline in the country.[76] Such pressures aren't over, either, as continuing international linkages—and post-COVID-19 supply chain shifts—suggest that trade exposure will likely be ongoing, dynamic, and oftentimes beneficial for Indiana, but in some cases disruptive. That should be of concern for Indiana policymakers, since in 2019, basic manufacturing (which is more vulnerable to import competition than advanced manufacturing) comprised a sizable 9% of the state's jobs—the third-highest share among states.[77]

At the same time, the risk of automation-induced wage declines has also been elevated for Hoosiers, as firms find new ways to reduce costs, increase output, or manage social distancing. That is because the state's particular industry and occupational mix—with its reliance on production industries and repetitive services activities such as administrative support and sales—has proven to be widely susceptible to automated solutions. Looking at the use of robots in the last decade, for example, Brookings calculations using data from the International Federation of Robotics and economists Daron Acemoglu and Pascual Restrepo conclude that the state's robot exposure, measured by robots per worker, is over four times higher than the nation's as a whole, and has generated significant automation-induced wage declines—likely more than in any other state.[78] But that's the story only for robots—looking forward at the full range of automation technologies,

Figure 46. Indiana's employment services industry has grown three times faster than overall employment since 2009

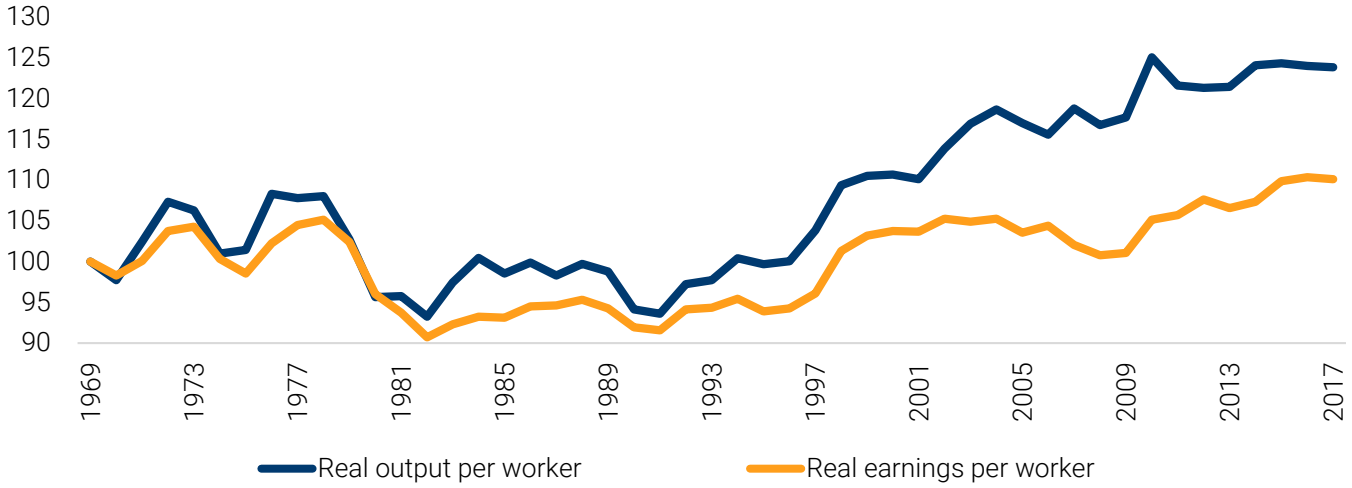
Growth of employment services in Indiana, 2009-2019 (2009=100)



Source: Brookings analysis of BLS data.

Figure 47. The modest gains the state has scored on output growth over the last three decades have rarely resulted in robust real earnings growth for workers

Output-earnings gap in Indiana, 1969-2017 (1969=100)



Source: Brookings analysis of BEA data.

Brookings research concludes (as noted earlier) that nearly one-third of Indiana jobs are now highly susceptible to existing automation technologies—the highest share in the country.[79] For wages, this means that middle-class jobs associated with routine tasks are at risk, forcing displaced workers to compete for lower-wage service work, while the remaining production jobs go to specialized, higher-skill workers.[80]

Given these trends, many Indiana workers may well continue to face downward pressures on pay and job quality thanks to the state's industry mix and its many rote, automation-prone jobs. In this fashion, regions with especially high shares of automation-susceptible employment may have to grapple with especially low worker pay.

And yet, more than just the state's industry and occupational mix is depressing job quality in Indiana. Also significant have been changing management paradigms that have lowered the ability of workers to command high wages or see the dignity of their jobs improve in the face of technology change.

To begin with, the spread of management structures in which companies focus on core value-creating activities by outsourcing noncore activities such as janitorial services or IT support to specialized third-party contractors has for years been eroding the direct relationship of firms and workers in Indiana, with negative impacts on pay, benefits, and advancement. Such "fissuring" of the workplace has seen Indiana's employment services industry—which provides temporary workers to corporate clients—grow three times faster than overall employment since 2009. This may improve firms' bottom lines but likely limits the creation of good jobs.

Likewise, the so-called "contingent" economy continues to grow, including through the spread of "gig" employment and the rise of nonemployer firms. For example, the number of nonemployer firms in Indiana (firms comprised only of self-employed freelancers) has grown 1.6% annually since 1997, while overall employment in the state has only grown 0.5% each year over the same period. In many of these circumstances, workers have lost some or all of their ability to negotiate contracts and build relationships directly with employers.[81]

Add it up, and these trends—together with a decline in unionization—have diminished workers' ability to share in the profits of their labor, as argue economists Anna

Stansbury and Lawrence Summers.[82] As a result, the modest gains the state has scored on output growth over the last three decades (in the 2000s, especially) have rarely resulted in robust real earnings growth for workers. Instead, real output per worker grew 32.3% between 1991 and 2017, but real earnings per worker grew only 20.3% over the same period.

Public policy has struggled to address market dynamics that have eroded job quality in many industries

Beyond purely market and business management trends, an aging state policy framework has also left Hoosiers vulnerable to economic shifts. On this front, Indiana state policy has struggled to keep up with massive change—with implications for job quality.

At times, Indiana policy has actively taken the side of firms against employees, with negative outcomes for workers. More often, though, Indiana policy innovation has simply lagged behind market changes that subject firms to intense pressure to improve financial performance for investors, and therefore to limit wages and benefits, with significant implications for workers—and state government.

Indiana's historical and contemporary industry mix, in this fashion, has been and continues to be affected by both global economic currents and disruptive technology developments to a degree not seen in most states. Import competition, automation, and new management paradigms like outsourcing and "platform" work have all likely contributed to pay stagnation, benefits limitations, and greater precariousness for many workers. Given the gravity of these changes and the speed with which they have occurred, policy stances dating back generations have often failed to update frameworks for maintaining fair and decent wages, career paths, and the dignity of work. As a result, workers have been left mostly on their own to deal with decades of flat real earnings and declining wage stability.

The benefits that employers provide their employees have also been declining over the last two decades. For example, the share of Hoosiers receiving health coverage through employer-sponsored health insurance has been in decline since the turn of the century, falling from 58% to 48% between 2000 and 2019.[83] This puts Indiana in the bottom half of states, at 28th, with additional evidence indicating that a significant number of Indiana workers have lost their employer-sponsored health insurance in the COVID-19 downturn.[84]

With that said, Indiana has a history of innovative policy moves leveraging Medicaid, which has helped counter some of this decline. In 2008, Governor Mitch Daniels enacted the Healthy Indiana Plan (now known as the Healthy Indiana Plan 1.0), which expanded health insurance to over 42,000 Hoosiers. And in 2013, Governor Mike Pence took advantage of Affordable Care Act provisions to enact Healthy Indiana Plan 2.0, expanding health coverage to more than 200,000 previously uninsured residents. But even with these efforts, Hoosiers overall still lacked health insurance at a higher rate than nearly every peer state.[85]

The decline in benefits has played out even more strongly on the retirement side, as the share of Indiana workers with an employer-sponsored retirement plan has declined by 20 points since 2000, to just 45% in 2019.[86] This decline was been the eighth-largest among all states.

In short, the fraying of the traditional employer-employee social contract and the erosion of the voluntary, employer-provided safety net in Indiana have hurt the state's workers and led to declining economic competitiveness, as workers leave to pursue a higher standard of living in other states. To reverse these trends, Indiana is going to need to develop and adopt new policies, benefits, and protections that will help make more jobs good jobs.

5 STRATEGIES FOR **RESILIENCE**

Indiana has an opportunity to elevate its economic trajectory. Yet to do this, it needs to do more than just manage a serviceable recovery from the immediate COVID-19 shock and recession. Rather, the state needs to address some of the deeper economic challenges it faced prior to the pandemic and that now may have been exacerbated by the events of 2020.

Of course, the desire to engineer a basic recovery that returns Indiana to "normal" is understandable. The year's festering joblessness, its local business closures, and the lingering rawness of social and economic divides have already burdened Hoosiers with a decade's worth of distress.

But a return to normalcy will not suffice. As the preceding trend and problem analyses have underscored, the pre-pandemic "normal" entailed several preexisting conditions that COVID-19 laid bare.

As this report has suggested:

- Indiana has experienced weak recent growth because its most valuable advanced industries have been losing competitiveness due to a lackluster pace of technology investment.
- Indiana has struggled to adapt to recent economic changes, particularly in the wake of recessions, which has contributed to sluggish job growth.
- Indiana is creating too few good jobs that pay a family-sustaining wage, thanks to global economic changes that have outpaced policy.

And so, Indiana needs to shoot for enhancement, not just recovery. Fortunately, state leaders can choose to reject drift and instead leverage decisions to help the state move toward a stronger growth trajectory. To be sure, not everything that needs doing can be named now or attempted in a single legislative season following a year of public health emergencies and revenue declines. Still, Indiana can and should take steps that begin to place it on a different path—a path of more competitive firms and industries, more vibrant growth and labor markets, and more economic inclusion. In short, the state now has an opportunity to rebuild itself better than it was before the crisis.

What attainable moves will make a difference? Indiana should take actions that speak to the recognized resilience factors called out in Sections 3 and 4. Specifically, the state needs to embrace a number of connected actions aimed at systematically upgrading its economic vitality by way of its technological position, the health of its industry mix and labor market, and the inclusivity of its economy. To that end, this section suggests a number of specific recommendations through which the state and its business and civic partners can:

- Accelerate digital adoption to drive economic dynamism and competitiveness
- Promote favorable job creation and worker transitions to allow beneficial "rewiring" of the economy
- Do more to support workers who aren't in "good" jobs

STRATEGY #1: ACCELERATE DIGITAL ADOPTION

At a moment of accelerating technology deployment, it is urgent that Indiana leaders promote faster and broader digital adoption, which remains one of the best ways to dispel the state's productivity slump and generate quality jobs and new prosperity.

Research conducted for the Indiana GPS Project emphasizes that just as productivity growth is a prerequisite for good jobs and prosperity, IT adoption is a powerful source of productivity. Technology use, in fact, turns out to be a powerful driver of dynamism across the whole economy—not just in "tech," but in firms, for workers, and for households. Overall, the diffusion of digital technologies not only makes firms more productive, but also boosts pay for workers in digital occupations.

Given this, Indiana should launch a major push to help more firms across the state adopt digital technologies and equip more workers with the skills to use them. At the same time, the state needs to ensure that its digital infrastructure—particularly broadband internet—is modernized to facilitate workers' and firms' use of these technologies.

To make progress on these goals, the state should pursue three main policy objectives:

Drive digital adoption with a "Digital Indiana" initiative
Encourage digital skills development by adding a digital skills requirement to the Indiana College Core (formerly the Statewide Transfer General Education Core)
Begin to solve the state's broadband disconnects

Drive digital adoption with a 'Digital Indiana' initiative

To start with, Indiana needs to embark on a serious push to increase IT adoption by Indiana firms, especially small and medium-sized enterprises (SMEs).

As this report has shown, digitalization has been proceeding too slowly in Indiana at a moment of "digital everything." Given that, a mix of cultural and business hurdles are holding firms back. On the culture and information side, awareness of "Industry 4.0" best practices and the returns on digital systems and processes remain issues, as the Conexus Indiana/ Indiana University survey stressed. On the business side, equal numbers of firms express uncertainty about where to get advice and the upfront time and financial costs of tech investments.

Which is why the state, business groups, and regional economic organizations should launch a two-pronged "Digital Indiana" campaign to overcome such tech-adoption hurdles and drive a culture of tech leadership among all Hoosier firms, whether on Main Street, in manufacturing, or in the advanced industries. Along these lines, the state should:

- **Launch and promote a Digital Indiana awareness campaign** to encourage more SME leaders to see the need for absorbing tech in their businesses.
- **Develop a true digital adoption infrastructure** to help more SME owners, managers, and workers manage the process of going digital.

Because many owners and managers do not always know or are uncertain about the importance of digital technologies for business survival and growth, the first prong of the initiative includes ways to get the word out. These challenge leaders to:

- **Actively communicate the importance of digital adoption** and a tech mindset
- **Create a "digital champion" and advisory council** to spearhead a plan for driving digital awareness across the state
- **Deliver a powerful statewide Digital Indiana marketing plan**
- **Create regional grants to mobilize awareness-raising** in Indiana regions, with local events, demonstrations, training programs, conferences, and networking opportunities that have been shown to change minds

For the second prong of the initiative, the state should begin to build a true digital enterprise theme into its business support offerings, knowing that expert advice and material aid to minimize upfront costs are key factors of success. Key moves include:

- **Assert leadership on digital-economy issues** through substantive participation in major corporate-philanthropic initiatives, such as to secure

state relevance on must-have technologies like AI and advanced analytics

- **Extend the EASE manufacturing readiness initiative and expand it to include a Digital Indiana Readiness Grant**, parallel to the existing Manufacturing Readiness Grant, but focused entirely on digital adoption
- **Establish the nation's first Digital Adoption Partnership** to support nonmanufacturing businesses' adoption of digital technologies
- **Create a Digital Indiana Regional Grant** to stimulate region-based digital adoption efforts

Altogether, the full initiative could cost as much as $36 million a year. However, implementation could likely deliver large returns on investment, given that it could build on several existing programs and improve the management and performance of hundreds of Hoosier firms, with significant economic returns in both the goods-producing and service sectors. Also, parts of the strategy could be financed with no new taxes through the Advanced Sector Growth Fund model described below, as an element of the "Promote favorable job creation and worker transitions" agenda.

Encourage digital skills development by adding a digital skills requirement to the Indiana College Core

The rush toward digital "everything" in the economy requires Indiana and its industry partners to promote more tech adoption in firms. But tech adoption is not just a matter of installing hardware and software. It also involves the human side, and will increase the digitalization of virtually every occupation.

All of which means that to increase its digital competitiveness, Indiana will need to increase the readiness of its workers to handle the increasingly digital nature of its jobs.

Fortunately, the state has embarked on some of the necessary work, particularly on the K-12 level. With that said, Indiana has not taken the same comprehensive approach to digital skill development within its public higher-education system, nor has it focused adequately on the "middle-skill" tech skills that require less specialized knowledge than coding, for example, but are more broadly used in workplaces. This leaves postsecondary students and working people out of the discussion when it comes to digital skill development.

Given that, Indiana should avail itself of another important opportunity for signaling the importance of digital competencies to students and institutions, and providing postsecondary students—including adult learners—the opportunity to obtain such competences. In that vein, the state should:

- **Revisit the Indiana College Core (formerly the Statewide Transfer General Education Core) to insert a new digital competencies requirement** to ensure more students gain exposure to essential digital skills

To do this, the Indiana Commission for Higher Education should update the state's existing statewide education core to promote digital competencies. Ideally, this update would take the form of the addition of a new, seventh competency area that would be developed by the state's public two- and four-year institutions in collaboration with the commission. With such a standard in place, thousands of Indiana learners would profit from new signposting and new course offerings that would influence their course selection.

There would be no direct state budgetary costs associated with inserting a digital competencies requirement into the general education core. The new requirement would likely stimulate valuable educational activity by ensuring tens of thousands of undergraduate-degree-seeking students gain tech-related skills.

Begin to solve the state's broadband disconnects

Going digital, however, will not be possible for many firms or educational institutions without significant further investment in digital infrastructure across the state. Specifically, Indiana needs to invest more deeply in broadband internet. Broadband has never been more critical, with remote work, learning, and health care the emerging new normal. But connectivity divides have left many Hoosiers without access to high-speed internet, making it a struggle to adapt to the new reality.

Indiana faces significant broadband challenges, but they are not insurmountable. What is needed is a sustained

campaign—not just over the next budget cycle, but over the next decade—to consciously reverse these trends and close the broadband gap.

The state should therefore take five policy actions to set itself on the path toward greater broadband coverage and a narrower digital divide. To begin with, the state should take two actions to immediately support e-learning and student educational access:

- **Establish a state e-learning fund** to purchase internet-connected devices, hotspots, internet service plans, and complementary software for students in need during the crisis. Additional fund uses could include professional skill development to increase distance-teaching capacity and capacity-building for parents and families to support students in remote learning.
- **Support regional efforts to establish wireless e-learning networks** using schools as the connection point. In the short run, the state should support ongoing pilots in Marion, Jasper, Newton, and Tippecanoe counties, as well as any other pilots that are started in the coming months. Additionally, Indiana should consider providing seed funding to scale up several additional pilots in communities across the state, to get a cross-section of communities that resembles the state as a whole. These pilots are a critical source of learning in advance of broader-reaching solutions.

After this, the state should take three additional steps to expand broadband more generally in the state and close the gaps that exist in all types of communities across Indiana:

- **Update the state's Next Level Connections program** by providing grants directly to communities to allow them to accept competitive bids from broadband providers, and by reforming the provider challenge process
- **Reorganize the Broadband Office** under the governor, give it an inclusive mission, and provide it with financing authority and capitalization
- **Modernize the Indiana Universal Service Fund** to fund sustained investment in broadband

Each of these policy items can be started with relatively limited upfront investment. For example, in the short run, a state e-learning fund can be funded with $10 million. Efforts in Central Indiana show pilots to establish local wireless e-learning networks cost around $750,000 each, so an investment of $4 million could expand four existing state pilots as well as scale up several additional ones. Updating the Next Level Connections broadband grant program would require staff time to rewrite the regulations, but the state could potentially leverage federal COVID relief dollars for additional rounds of grant funding.

Finally, modernizing the Indiana Universal Service Fund (IUSF) will not only entail no new costs, but could actually be a significant source of *new* revenue at a critical time. The IUSF currently produces approximately $11.5 million per year in revenue. If broadening the base to include more cable companies and other data providers doubled the revenue collected, it would produce an additional $11.5 million in annual state revenue. Making the state universal fee more progressive to increase revenue would likewise generate significant new resources.

Regional and business strategies for enhancing digitalization

Regardless of what the General Assembly can get done this year in a challenging session, Indiana regions and business communities can achieve a lot on their own to keep pace with broader digitalization. In fact, they already are.

The recommendations provided in this report are primarily focused on state government. However, on every theme—including digital adoption—meaningful nonstate actions can be undertaken by regional leaders and business executives to advance tech uptake and broader prosperity. Multiple communities are already doing just that through existing initiatives, many of which reflect new levels of multijurisdictional coordination prompted by the coincidence of the state's Regional Cities Initiative and Lilly Endowment Inc.'s Strategic Community Advancement Initiatives.

Along these lines, regions and local industry networks can address key aspects of this report's digital agenda. On promoting digital adoption, regional organizations and industries cannot run sizable statewide technology grant programs. However, they are ideally positioned to facilitate awareness among SMEs; organize networking, learning, and coaching opportunities; and leverage local technology organizations to provide expert advice. In that sense, cultivating a tech mindset is something regional and business networks can help with.

Likewise, because they encompass and constitute local labor markets, regional organizations and industry groups are perfectly situated to deliver digital skills development, including for disrupted or underrepresented groups. And while adequate financial resources and technical assistance are often needed, counties and regions are increasingly able to tackle local broadband challenges.

Promoting digital adoption

As to tangible action, regional organizations and business networks are already working on many of these priorities, starting with digital adoption.

In Central Indiana, for example, Conexus Indiana—the Central Indiana Corporate Partnership's advanced-manufacturing and logistics initiative—has emerged as a dynamic hub of digital awareness activity, with a steady stream of research, networking events, and demonstrations focused on highlighting Industry 4.0 technologies and promoting digital transformation among Hoosier firms. At the same time, established and new programs based at Purdue University in the Wabash Heartland and the University of Notre Dame in Northern Indiana are demonstrating what high-quality expert consultation and business-support programming on digital adoption looks like. For instance, Purdue's Manufacturing Extension Partnership (MEP) and Indiana Manufacturing Competitiveness Center (IN-MaC) are established sources of expert consultation on digital transformation, with offices around the state.

Meanwhile, the new iNDustry Labs at Notre Dame provides additional digital transformation services to businesses in its region, in partnership with the area's LIFT Network. To the extent the state engages on digital transformation, it should leverage and support these notable regional efforts and help them expand their program offerings to include the digitalization of the service and manufacturing sectors.

Delivering digital skills development

Promoting digital skills development has also been an area of strong regional self-help and problem-solving, with initiatives existing in numerous Indiana regions.

In Northern Indiana, for example, the South Bend-Elkhart Regional Partnership (SBERP) is developing a planned LIFT Network Digital Skills Accelerator, consisting of a $3.4 million fund to develop degree and nondegree credentialing programs that align with the growing demand for digital skills among the area's advanced-industry employers. In Wabash Heartland, the Wabash Heartland Innovation Network (WHIN)—which focuses on the region's potential as a center of Internet of Things-powered digital agriculture and next-generation manufacturing—has been working with Eleven Fifty Academy and Purdue to identify and respond to the region's specific coding and data science preparation needs. For its part, the Northeast Indiana Regional Partnership is also working with Eleven Fifty to bring a "branch office" presence to the area to raise tech skills.

Foundational digital skills have come to the fore in other areas. The EcO Attainment Network in Southeast Indiana worked this summer to focus its ongoing digital skills work on low-income and Latino or Hispanic adult learners, working with regional adult-learning providers and Ivy Tech Community College to bring professional-development training to instructors in order to strengthen foundational skills education in the area. There and elsewhere, regional organizations and networks are elevating awareness of the need to provide the digital skills development that will be required for widespread digital adoption.

Tacking local broadband challenges

And then there are the state's multiple "bottom-up" initiatives aimed at addressing Indiana's serious broadband gaps. This work ranges from needs assessment and planning to delivering leading-edge solutions.

To the matter of planning, the Regional Opportunity Initiatives (ROI) in the Indiana Uplands is working with the Purdue Center for Regional Development (PCRD) to produce a comprehensive, 11-county digital inclusion plan to address broadband issues in the region. It is expected that this outreach, research, and planning effort will equip communities in its 11-county region to successfully seek funding from multiple sources to implement the plan and adapt to the "digitalization of everything."

But problem-solving in the state goes beyond planning, to the delivery of both rural and urban solutions. In the heavily agricultural Wabash Heartland area, WHIN is continuing to test innovative ways of using and combining spectra—like the novel technology known as Citizens Broadband Radio Service (CBRS)—to deliver high-quality rural broadband while also pushing ahead with a first-of-its-kind plan to deliver high-speed internet service with an aerostat (a type of blimp). In urban Marion County, meanwhile, Indianapolis is supporting the launch of a $1.7 million pilot network to connect students at six public schools with high-speed internet for e-learning. If it proves successful, the pilot—which also uses CBRS—would be scaled up to service public school students countywide as soon as early 2022. Funding for the pilot comes from the city's CARES Act funds, the Richard M. Fairbanks Foundation, Lilly Endowment Inc., and the Indiana 5G Zone. The 5G Zone and another CICP initiative, Energy Systems Network, will implement the project, drawing on their experience managing technology pilots.

STRATEGY #2: PROMOTE FAVORABLE JOB CREATION AND WORKER TRANSITIONS

Favorable industry, job, and work reallocations—ideally from less desirable to more desirable configurations—are also going to be crucial in improving the nature of Indiana's recovery and its next economic transitions. Such transitions have the power to "rewire" the economy for the better, allowing it to change and adapt, while helping displaced workers reconnect to sustainable work. But right now, this process is fraught.

Over the past year, the COVID-19 crisis has evolved from a short-term shock necessitating temporary layoffs into a more uncertain downturn with significant employment reorientation and labor market displacement. Many workers now lack the option of returning to their former jobs due to a combination of sharp shifts in consumer and industrial demand, firms' increased adoption of labor-saving automation technologies, and the continued effects of ongoing global trends such as international trade, among other factors.

Securing favorable worker transitions—say, from a lost job or precarious industry to new or better ones—will remain challenging for months. First, there are still 50,000 fewer Indiana jobs than there were in February 2020, meaning there are many more job seekers than job openings. Second, multiple matching and skills challenges complicate workers' transitions.

In response to these challenges, the state should consider four near-term policy priorities. These would:

- Leverage incremental income tax gains to fund regional advanced-industry sector growth initiatives
- Enhance entrepreneurship and small business development, with a focus on entrepreneurs of color
- Better leverage unemployment insurance and work-sharing to boost employment and economic growth
- Promote more effective worker adjustment by continuing to support Next Level Jobs and the Workforce Ready Grant

In addition, as the economy continues to recover and the labor market tightens in future years, the state should look to support all workers' search for the right job and employer. To do so, the state should:

- Enhance work connections with a statewide online matching platform

Leverage incremental income tax gains to fund regional advanced-industry sector growth initiatives

Indiana needs more quality jobs to make sure the recession's reallocation episode ultimately strengthens the state economy rather than weakens it. Creating a job-rich environment will promote that; but for now, the state is contending with a pandemic-related job shortage piled onto a longer-term growth problem in its advanced-industry sector, with both problems stressing all Indiana regions.

The result is a conundrum that presents real challenges for statewide policymakers trying to revitalize the economy with limited resources. Significant investments are needed, but both the scale of the sector's needs and the constraints of the fiscal moment pose obstacles.

Yet for all of that, Indiana has an opportunity to leverage a creative investment model to generate—with no new taxes—significant financial resources for both statewide and regional use in catalyzing advanced-industry sector growth in all of the state's regions.

Specifically, the state can and should deploy a form of "tax increment" financing that has been used elsewhere in the country to capture and reinvest the incremental growth in state revenue generated by the advanced-industry sector, for the purpose of enabling the state and its regions to invest in driving even more growth in the sector.

To launch the new initiative, policymakers should build on solid precedents in Kansas, Ohio, and Colorado to:

- **Put in place a new development-finance mechanism to support the new program**. This would place the incremental growth of income tax collections in the sector in a new Advanced-Industry Sector Growth Fund. Brookings estimates that these collections could amount to $16 to $20 million in the first year and ramp up to $80 to $100 million annually after five years, assuming sector growth similar to that of the last decade.
- **Establish a system for distributing revenue**, with one-third of the funding used to support statewide

advanced-industry sector growth initiatives detailed in the Indiana GPS Project agenda, and the remaining two-thirds distributed to Indiana regions by formula to support regional advanced-industries initiatives. The state would designate intermediaries in each region to develop and execute advanced-industry sector strategies and receive and distribute funding.

- **Approved regional uses of the revenue yield**. Strategies and investments allowed by the program will, of course, be approved by the legislature, but could include: industry-university partnerships in regions; technology advice, testing, and acquisition; education and workforce development; entrepreneurial services; economic inclusion; and quality-of-place—and important contributor to advanced-industry sector economic development.

Note, finally, that the growth fund initiative would require no new taxes. Impacts on the general fund would only occur in future years and would be entirely contingent on the growth of Indiana's advanced industries.

Budgetary effects and certainly economic effects could, in fact, be significantly *positive* given the taxable multiplier effects of accelerated advanced industries growth and the sector's high capital investments and long supply chains.

Enhance entrepreneurship and small business development, with a focus on entrepreneurs of color

Entrepreneurship is also a powerful tool to counter recessions and promote economic "rewiring." Unfortunately, Indiana lacks the levels of growth-driving firm creation found in other states. Overall, the state leans toward older, larger firms. At the same time, racial disparities—including shortages of Black entrepreneurship—have deepened the COVID-19 downturn in communities across the state.

What's more, while Indiana is pursuing an agenda to support high-tech startups and advanced manufacturing, Main Street businesses important for improving neighborhood and community vitality can be easily overlooked.

Given that, during the 2021-2022 state budget cycle, the state should take several actions to promote Main Street entrepreneurship across the state, with a focus on underrepresented entrepreneurs and communities.

To that end, the state should consider a number of opportunities for fostering an upsurge of entrepreneurial activity as it moves through the COVID-19 recession. Action steps could:

- **Establish a state Community Development Financial Institutions (CDFI) fund**, modeled on the federal CDFI Fund and New York's state CDFI fund, to support mission lenders in the state. These funds promote growth and opportunity in some of the nation's most challenged communities by offering tailored resources and innovative programs that invest federal dollars alongside private capital.
- **Establish a state loan-loss reserve fund**, with an emphasis on equitable microloans, to help financial institutions cover financial losses to "riskier" borrowers and encourage them to make more loans to borrowers who don't meet traditional borrowing requirements.
- **Enhance existing Small Business Development Center (SBDC) funding** and provide greater support for entrepreneur mentorship.
- **Increase transparency around contracting** with the state, and commit to meeting contracting goals by state government agencies and public higher-education institutions.

In future legislative sessions, the state should take further action to promote entrepreneurship and small business development in order to promote a more robust and equitable recovery, including:

- **Enhance cooperation among existing CDFIs**, other Small Business Administration (SBA) microlenders, and traditional lenders in the state who are focusing on underrepresented groups.

While this initiative would work best as a comprehensive suite of policies, each program within could be enacted as a standalone element, as follows:

- Establishing a state CDFI fund would require a $10 million initial investment.
- Creating a state loan-loss reserve fund for equitable microloans could receive an initial investment of $6 million.
- Increasing transparency around minority- and women-owned business contracting with the state, and committing to meeting contracting goals, would have little-to-no cost.
- The state should look at increasing funding for SBDCs from $2.3 million to $20 million.
- Enhancing cooperation among mission and traditional lenders—including creating an online portal, establishing a state office dedicated to helping entrepreneurs navigate state resources, scaling up entrepreneurship support in underserved areas, and undertaking an awareness campaign—could cost around $5 million.

Likewise, each component of this initiative could be started with significantly less funding and scaled up with more funding as the state's budget situation improves.

Better leverage unemployment insurance and work-sharing to boost employment and economic growth

Even as Indiana's labor market recovers, however, the state's labor market—or at least parts of it—is likely to remain soft through 2021. So, although the topline unemployment numbers are better than they were, a look beneath the surface statistics reveals slack in the state's job market. A variety of indicators—including lagging job postings and elevated levels of workers in involuntary part-time work—signals that the state will see continued labor market stress.

Fortunately, Indiana has a ready-made tool to help counter labor market disruptions: its unemployment insurance (UI) system. While UI is essential for helping workers who lose their jobs, it is also a significant asset for encouraging positive labor market developments. By making better use of its UI system, Indiana could reduce layoffs by incentivizing firms to keep workers on part time; encourage workers to rejoin the labor market, even if part-time employment is their only option; and increase economy-rejuvenating consumer spending across the state in slow times.

To do all of that, then, the state legislature should enact three UI-focused reforms that will help bolster growth even as the economy remains weak, or for future disruptions. These are:

- **Establish a work share program** to reduce layoffs while supporting the health of the Indiana UI trust fund.
- **Modify the phase-out of partial unemployment insurance** to encourage workers to take part-time employment where possible.
- **Raise the state's UI replacement rate and increase the weekly maximum benefit** to further encourage part-time work and support greater consumer spending.

If work share and partial unemployment insurance were widely embraced in Indiana, it could save several thousand jobs per year and encourage more workers to remain attached to the labor force. This would help: workers, who can maintain their salary and benefits; firms, in the form of reduced employee turnover and lower recruitment and training costs; and the state, in the form of healthier income tax receipts.

Due to how it is structured, a work share program should have only modest net new costs for the state. While some companies who would reduce their workers' hours in the absence of a work share program may choose to create one to help soften the blow of the reduction in hours, creating new costs, other companies who would lay off their employees outright will instead choose to keep them on payroll at reduced hours, which should save the state money. Removing the current disincentive to seek part-time work will likewise have minimal fiscal costs. Recipients are already receiving UI benefits—the change would incentivize them to also work part time if possible.

Raising Indiana's replacement rate from 47% to 57% would provide the average unemployed Hoosier an extra $54 per week at an estimated cost of $37 million in 2019—a 15% increase over actual 2019 spending. Raising the state's maximum UI benefit by $150 would have resulted in $17 million in new spending on UI benefits in 2019, around a 7% increase over actual spending.

All of these new expenses could easily be offset by a modest increase in the state unemployment tax. While costs would have been significantly larger in 2020, that is largely due to the unique nature of COVID-19-required business closures. As such, 2019 numbers are a more accurate representation of what typical annual costs would be.

Promote more effective worker adjustment by continuing to support Next Level Jobs and the Workforce Ready Grant

Indiana also needs to continue boosting support for worker transitions, the need for which will likely remain elevated for the foreseeable future and often require increased education and training. While many Indiana workers have been rehired after only a temporary layoff, others have not been, or they have been but only in precarious or marginal industries that may be vulnerable to further change.

Given that, many Hoosier workers will likely need to find employment in occupations or industries that differ from their pre-pandemic work in the next few years. And to do that, many of them will need to acquire new skills or certifications to make successful career transitions.

Fortunately, Indiana has a strong existing skill development framework, in the form of the state's Next Level Jobs program. Next Level Jobs established several training grant programs designed to increase workers' skills and meet job requirements in high-demand occupations across the state.

One of those programs, the Workforce Ready Grant (WRG), is particularly relevant for meeting the state's reallocation challenge. The grant provides free job training for Indiana workers without a college degree, allowing them to take both for-credit and noncredit coursework toward approved certifications in five sectors that the state considers high-wage and high-growth: health and life sciences, IT and business services, advanced manufacturing, transportation and logistics, and building and construction.

Given its ability to help workers looking to make a career transition regardless of their employment status, the WRG will continue to be an important tool for the state's

If work share and partial unemployment insurance were widely embraced in Indiana, it could save several thousand jobs per year and encourage more workers to remain attached to the labor force.

recovery in the coming years. To ensure it functions as successfully as possible, the General Assembly should consider several steps to further bolster the program's efficacy.

In the immediate term, the state should:

- **Preserve funding for the WRG** by maintaining the program's $4 million state allocation.[87]

Despite improving topline numbers, Indiana's employment challenges are not yet over. So while the General Assembly will certainly face tough funding choices in the 2021 budget cycle, workforce development programs like the WRG should remain a priority.

In future legislative cycles, the General Assembly should take additional steps to ensure the WRG is more efficient at connecting Indiana workers to employment and more accessible to Hoosiers of all income and education levels. Along these lines, the state should in the future:

- **Enhance career coaching and employer linkages** for WRG participants
- Explore relationships with community- and faith-based organizations to **enhance wraparound services for program participants**
- **Improve coordination** with other skill development programs in Indiana

The state will likely want to boost its investment in career services and employer linkages for grants in order to help newly trained participants move into jobs as efficiently as possible. In addition to career counseling, workers (particularly those in low-income jobs) may need other "wraparound services" such as child care, transportation, tutoring, or counseling to make training feasibly. One way to improve access to wraparound services is to increase support for partnerships with community- and faith-based organizations.

Lastly, the General Assembly could consider additional changes to better coordinate the Workforce Ready Grant with other skill development programs and make it more accessible. These could include improving connections between the WRG and the state's Adult Basic Education and WorkINdiana programs; encouraging more employers to use the Workforce Ready Grant rather than the Employer Training Grant to unlock more federal funding for the state (in the form of federal financial aid) and free up Employer Training Grant resources; and expanding eligibility for workers who already have an associate or bachelor's degree but are looking to make a career transition.

Other opportunities

Looking forward, there will be other needs. For example, one critical need will be for steps to speed the "adjustment" process, through which workers find new career opportunities that match their skill set and career path. Facilitating faster, higher-quality matches between workers and available jobs will be extremely important in rewiring and upgrading the economy going forward.

To facilitate such matches for all kinds of Indiana job seekers and firms, Indiana should **support the creation of a high-quality, online statewide platform for matching job seekers to job opportunities.** Doing so will accelerate connecting workers to jobs, lessen the time that workers spend unemployed, and improve the overall fiscal picture of the state through a quicker return to a healthy labor market. Such a program could be implemented centrally, or supported for regional implementation. For example, the Indiana Department of Workforce Development (DWD) could build a completely new, centralized job-matching system to replace Indiana Career Connect, and couple that with significant new investment to hire career coaches across the state. Alternatively, though, the department could work with existing regional providers that are already offering matching services (such as Ascend Indiana in Central Indiana) to develop a more formal partnership for providing matching services across the state.

As the economy heals, it will not be enough to ensure that the state create just any jobs. To ensure job creation is both robust and high-quality, the state will need to both enhance its digital adoption and also leverage policy to create more good jobs. To start, the state needs to enhance its lagging digital adoption, which will be one of the best ways to generate more high-paying work in Indiana.

Regional and business strategies for favorable job and work transitions

Indiana regional networks and business leaders can also support—and at times lead—in promoting favorable job creation and worker transitions.

Again, their roles in developing local industry clusters as well as labor market solutions ensure their centrality. As in the case of digital adoption, while regional organizations and firm leaders often lack the financial resources to deliver significant resources on their own, they are well positioned to pilot programmatic options and otherwise help "rewire" the economy by promoting quality growth and worker reorientation.

Regional economic development and business organizations operate at the forefront of the state's local economies, industry clusters, and supply chains. Therefore, these actors are ideally positioned to deliver smart interventions to drive growth in the advanced-industry sector and beyond. Already, these actors are making important contributions by alleviating information gaps, promoting university partnerships, prioritizing entrepreneurship, and facilitating capital access or physical investments—hence their central delivery role in this report's state-level tax increment proposal. Given such capacities, there is no reason these organizations cannot spearhead a state-local convergence around advanced-industry sector growth strategies and finance.

At the same time, such organizations—as well as local workforce investment boards (WIBs), training intermediaries, community colleges, and other educational institutions—work on the frontlines of worker training, retraining, and transitions. Given that, regional actors and local businesses also have big roles to play in helping the wider state design, align, and deliver industry-relevant, worker-supportive education, training, and job-matching innovations. Working together these organizations can and are delivering cogent models and programs for work-related education, training, and career coaching.

Along these lines, Indiana regional organizations and business networks are already showing the way on both quality job creation and worker transitions.

Driving growth in the advanced sector

On quality-job creation, multiple regional development organizations are pursuing serious, data-informed regional cluster strategies to accelerate growth. For example, the Regional Opportunities Initiative (ROI) in the Indiana Uplands is continuing to pursue and update an extensive regional defense-industry strategy, focused on the opportunities associated with the region's access to the Naval Surface Warfare Center Crane Division. Likewise, the Evansville Regional Business Committee (ERBC) in Southwest Indiana is spearheading a six-pronged, talent-oriented initiative to systematically accelerate growth and development in that region, with a focus on the priority sectors of advanced manufacturing and health-life sciences. And for its part, the Northeast Indiana Regional Partnership is continuing to organize its own regional cluster development efforts while working closely with Elevate Ventures and the Northeast Indiana Innovation Center to support entrepreneurial efforts.

Delivering worker education, training, and job-matching innovations

At the same time, Indiana regions are developing or implementing well-researched "talent" programs (in some cases prompted by the state's 21st Century Talent Regions initiative) that are beginning to put in place the frontline skills-development infrastructure that state needs.

In Southwest Indiana, for example, the ERBC's Talent 2025 strategy is pushing ahead with an ambitious plan to increase alignment between skills (and credentials) and future jobs with a focus on building a cradle-to-career education system. In East Central Indiana, meanwhile, Ball State University is working with the George and Frances Ball Foundation to shape a new East Central Indiana (ECI) Talent Collaborative to leverage existing programs and launch new ones aimed at building a high-functioning infrastructure for

strong collaboration on skill-building and employability. In parallel, the university is working to support lifelong learning and worker adjustment in the region through the development of an array of on-campus and online microcredentials, short-term learning modules, professional licensure workshops, and enrichment opportunities.

In Northern Indiana, meanwhile, the South Bend-Elkhart Regional Partnership—tracking shifts in the region's skills demands—is developing new demand-driven offerings for positions in the manufacturing sector, including apprenticeships and credentials for robotics technicians and software developers.

Finally, Ascend Indiana—CICP's workforce development initiative—has been upgrading and widening its online employment matching platform throughout the pandemic to better facilitate connections between the supply and demand sides of the regional job market. The result is another locally developed model for potential statewide scaling. Having piloted improved services prior to the pandemic, Ascend adjusted its infrastructure and design during the crisis to enable workforce development boards to serve dislocated workers and youth as well as college graduates. What now exists is a flexible, scalable, Hoosier-built tool for improving worker transitions. Work is proceeding to adapt Ascend's existing platform to the needs of the Southwest Indiana Chamber, as an example of such scaling.

STRATEGY #3: DO MORE TO SUPPORT WORKERS WHO AREN'T IN 'GOOD' JOBS

Finally, it bears remembering that even if Indiana pulls off a broad digital surge and facilitates optimal "reallocation" of the economy and labor market, that alone won't reduce the state's population of struggling workers. Large forces such as globalization and technology will continue to pose challenges for the widespread creation of good jobs, whether in Indiana or elsewhere. Therefore, Indiana—like every other state—will need to attend more to the basic needs of what will likely be a sizable pool of struggling workers for the foreseeable future.

Indeed, the COVID-19 crisis has only added to the many forces that are depressing wages in Indiana and elsewhere. Even as topline unemployment numbers ease, many Hoosiers are facing still-elevated unemployment, stagnant wages, and reduced bargaining power amid a weak labor market. At the same time, the aftermath of the crisis may well place additional pressure on the employer-based social compact, with fewer Indiana workers retaining access to benefits such as health care, retirement savings, and paid leave through their employer. And for that matter, nonwork responsibilities such as child care are continuing to take a significant toll on some families' income through both their substantial cost and negative impact on labor force participation, particularly for women.

This is why Indiana will need to undertake focused—and likely costly—policy responses if it wants to avoid the story of the past several recoveries, which were characterized by subpar job growth and continued pay slippage.

Many of the necessary responses will need to go beyond the usual reach of policymaking and are realistically best slotted for the future. But in the shorter run, the state can and should act in several ways to support quality employment in the state. In that vein, the state could:

- Establish a "Choice Employers" designation and provide such employers with premium support to encourage the creation of more good jobs
- Raise the state's Earned Income Tax Credit and pay it quarterly to boost worker income and predictability
- Authorize a state panel to explore a Medicaid buy-in program for able-bodied adults

- Enact a comprehensive child care agenda to support working families
- Enact a state-sponsored automatic IRA to encourage greater retirement savings

Establish a 'Choice Employers' designation and provide such employers with premium support to encourage the creation of more good jobs

Many Indiana firms want to support their workers in an effort to gain skills and increase their wages. However, there are significant market pressures that limit their ability to do so. These include competition from foreign companies and firms in other low-wage states, lagging productivity in Indiana industries, and a low-wage, low cost-of-living overall state economic framework.

The state invests significantly in attracting companies from out of state to come to Indiana. To help proactive employers counter these competitive pressures, Indiana should invest in companies already in the state by helping them provide career paths and good wages for Hoosiers.

To do that, the state should create a "Choice Employers" designation for firms that are willing to open pathways to good jobs for their employees. To induce firms to participate, the state could offer a variety of supports of Choice Employers. These investments could:

- Provide Choice Employers premium access to Employer Training Grants and remove the per-firm cap for these grants
- Provide priority support from state workforce development boards
- Allow Choice Employers to start their evaluation for state contracts with one point rather than zero, allowing it to act as a tiebreaker for the firm in government contracting
- Create a dedicated ombudsman to help Choice Employers navigate state resources such as connecting with relevant state departments and providing guidance around relevant state regulations
- Provide state matching funds to support firms' investments in worker supports such as child care and employee transportation

In exchange, Choice Employer firms would commit to:

- Provide a pathway for all employees currently in a low wage job to move into a good job that meets a regionally adjusted wage threshold and provides employer-sponsored health insurance within 1 year of receiving the designation
- Maintain or expand payroll in Indiana for at least five years
- Defray employee childcare and transportation benefits for each of its employees
- Enact a training program to give low wage workers skills they would need to move into a good job at the company

In the short run, a Choice Employers pilot could be enacted by repurposing existing budgetary items and adding modest amounts of new spending. For example, Indiana already allocates $20 million per year to the Employer Training Grant program, which could help finance training for up to 4,000 workers. If that money were directed to support Choice Employers who committed to providing a pathway to a good job for workers who went through training, it would support significant wage growth without any net new state expenditures. Other expenditures—such as an ombudsman and advertising campaign costs—may total $2 to $3 million in net new spending. Adding state subsidies for transportation and child care support could total to between $20 to $25 million over two years for up to 7,000 workers across selected companies, or just over $1,500 per worker per year.

Raise the state's Earned Income Tax Credit and pay it quarterly to boost worker income and predictability

Alternatively, Indiana may want to more broadly—and directly—support enhanced worker income by raising the generosity of the state's Earned Income Tax Credit (EITC), a tax credit for low- to moderate-income workers and their families.

Given the challenges on good jobs facing Indiana and other states, it should not come as a surprise that many Hoosier workers—particularly those not in good jobs—rely on both the federal and state EITC. Indeed, over half a million Indiana taxpayers claimed the tax credit in 2019, equivalent to 15% of the state's workforce. Most of those workers also claimed the state version of the credit. On the federal level, the average Indiana EITC claimant received a credit of $2,440, roughly average among states.[88]

Research shows that the EITC has a variety of important benefits. First and foremost, it can provide an important boost in pay for low-income workers in the state who are struggling to make ends meet. Indiana's existing EITC is a refundable credit, which means that workers can receive the full credit even if it brings their state income tax liability to less than $0. This allows workers to offset other taxes that they pay, such as state sales tax and local property taxes, and can provide additional financial security for working families. Because of its widespread use, the EITC is perhaps the single most important poverty reduction tool in the U.S. It also has important labor market benefits, helping to increase Indiana's labor force participation, particularly for single parents.

Indiana is one of 29 states that offer a state-level EITC to complement the federal credit. As with other states that offer a state-level EITC, Indiana's is set as a share of the federal credit: 9% of it, to be exact. In other words, an Indiana taxpayer's state EITC claim will be 9% of whatever their federal EITC is. Given that the average federal credit runs to $2,440, the average state EITC benefit in Indiana comes to just $220.[89] This is one of the lowest rates among any state that offers a state-level EITC; just five have a smaller credit as a percentage of the federal credit.

What's more, the EITC currently comes as part of a Hoosier's state tax return. While this provides a helpful annual cash injection for families, the annual pay-out is less helpful than it might be for supporting the day-to-day needs of working families.[90] And many working-class Hoosiers are in hourly jobs and may not always have a set schedule. These workers may make different amounts of money on a week-to-week basis, which can cause significant financial volatility for workers and households.[91]

So while it's great that Indiana is already taking advantage of this important income-boosting tool, there are two enhancements Indiana can make to bolster the impact of its state EITC:

- **Increase the size of the Indiana EITC** relative to the federal credit
- **Pay out EITC payments on a more frequent basis**, such as quarterly

To the size issue, it bears noting that Indiana's credit is just 9% of the federal credit, while many other states with refundable credits have much higher percentages, such as Kansas at 17%. Expanding the EITC to the size of Kansas' credit would give over half a million Hoosiers an extra $500 in income annually. Doing so could cost the state around $93 million based on estimates from state tax expenditure forecasts. Raising the EITC to 25% of the federal level could give some EITC recipients over $1,000 per year in additional income.

Quarterly payouts could make the EITC a more useful tool for smoothing income fluctuations for workers. Paying out the EITC quarterly would require some administrative costs, but should have no significant budgetary impact on the state. The state is already paying out the credit—this would just increase the frequency at which taxpayers receive it.

Authorize a state panel to explore a Medicaid buy-in program for able-bodied adults

Health insurance is a key feature of a good job, and the COVID-19 crisis has underscored the disturbing dimensions of the state's health coverage crisis. At a moment when tens of thousands of Hoosiers, including essential workers, were most in need of health coverage, many were left without it.

And yet, Indiana has a history of innovative policy moves leveraging Medicaid, which could be built upon to widen coverage. In 2008, Governor Mitch Daniels enacted the Healthy Indiana Plan (now known as the Healthy Indiana Plan 1.0). At its peak, the Healthy Indiana Plan 1.0 provided health insurance for over 42,000 Hoosiers. Then, in 2013, Governor Mike Pence enacted the Healthy Indiana Plan 2.0, expanding coverage to more than 200,000 previously uninsured Hoosiers. In addition to the Healthy Indiana Plan, there are other state health plans that leverage Medicaid's network and reimbursement structure. One example is MED Works, which allows disabled workers who feel they can return to work but are fearful of losing their Medicaid benefits to pay a modest monthly premium—pegged to a worker's income—in order to retain Medicaid coverage.

To expand health coverage further in the state, then, the General Assembly should authorize a state panel to explore how a Medicaid buy-in program could be enacted in Indiana.

Overall, such a panel would be charged with judiciously exploring a variety of different programmatic options for Indiana. The panel could bring a careful approach to working out a proposal that would reflect systematic analysis of who would be covered, how enrollee premiums and other cost sharing would work, financing models, and interactions with existing Medicaid-based programs.

Funding needed for a Medicaid buy-in study would be relatively modest. In recent years, several states have allocated funding to study enacting a Medicaid buy-in, providing a baseline from which Indiana can evaluate. In 2018, New Mexico's state legislature appropriated $142,000 to conduct a Medicaid buy-in study.[92] In 2019, Colorado's state legislature appropriated $571,500 over two years to conduct a Medicaid buy-in study, as well as to submit any wavers needed to the federal government in order to get preliminary approval for a program.[93]

The pandemic has underscored the importance of health insurance coverage, both for preserving the health and well-being of Hoosier workers and their families, and for supporting the state's economy. Exploring how to expand basic insurance coverage to workers who are currently excluded from the health care system should therefore be an urgent policy imperative for the state.

Enact a comprehensive child care agenda to support working families

For many Hoosiers, meanwhile, even securing a job is not enough if they lack access to affordable, quality child care. In addition to being both a public health and economic crisis, COVID-19 has also worsened an already acute child care crisis in Indiana. The most severe effects have fallen on women, who are more likely than men to cite child care demands as the reason they left the workforce.

Indiana should therefore establish a comprehensive child care agenda to help working Hoosier parents reenter the labor market.

In the short run, the state can take several immediate steps to support expanded child care, including:

- Enact a refundable, quarterly **child care tax credit**
- **Modify work requirements** for the state's On My Way Pre-K program and Child Care and Development Fund (CCDF)-funded programs to allow job search activities to count for initial eligibility for unemployed parents

In the future, the state can take more robust actions to enhance the coverage and quality of child care, such as:

- Change the state's funding model to **compensate publicly funded child care providers based on their enrollment and true costs**, rather than attendance and market prices
- Require that all children enrolled at providers receiving state or federal funding in Indiana **participate in a quality assessment program** that includes direct measures of skill development
- Create a dedicated state funding stream to **train qualified early childhood educators**, including through work-based or competency-based credentialing, and encourage providers receiving state or federal funding to meet "good job" salary thresholds to improve early childhood educator retention
- **Fund a state-supported shared services platform** for administrative functions such as finance, human resources management, and information technology support that can be leveraged by all child care providers in the state

- Fund development of an app that can **connect child care providers to qualified substitute teachers**

These robust changes would substantially alter the cost and supply problems that are preventing working families in Indiana from being able to access child care, and could help thousands of Hoosiers—women in particular—get back into the workforce faster. Not only that, but they would be a smart long-term investment for the state. As work by the American Enterprise Institute has noted, investing in children is repaid to the state in the form of a long working career, and child care policies can have a positive effect on marriage rates, fertility, and young families' impressions on Indiana as a place to live.[94]

Of the immediate action items on child care, modifying work requirements in public child care programs would have minimal net new costs to the state.

To enact a state-level child care tax credit, the state could follow the lead of other states such as Kansas, Oklahoma, Arkansas, Iowa, and Ohio by enacting a state-level credit pegged to a certain share of the federal Child and Dependent Care Tax Credit. This is similar to how Indiana manages its state-level EITC. An Indiana credit worth 50% of the federal credit—which could be worth between $1,500 and $3,000 for families—would reduce Indiana collections by roughly $49 million if it were fully refundable. However, several steps could be taken to fit the program to budgetary needs, such as enacting a phaseout for higher-income earners, or pegging the credit to a lower percentage of the federal credit.

Enact a state-sponsored automatic IRA to encourage greater retirement savings

Income security goes beyond just supporting worker income in the present, finally. A record number of Hoosiers—and Americans overall—find themselves with too little or no retirement savings, which will have significant implications for their economic well-being in retirement. Even before the COVID-19 downturn, the traditional employer-employee social contract on retirement benefits was fraying in Indiana, with the share of workers enrolled in an employer-sponsored retirement plan in the state declining 20 points, from 64% in 2000 to 44% in 2019.

To help reverse this trend, Indiana should enact an automatic state IRA program. This effective, nonpartisan policy was jointly designed by researchers from the Brookings Institution and the Heritage Foundation.[95] As of the end of 2020, seven states had passed legislation creating an automatic IRA program, and another 20 states and cities had introduced legislation considering one.[96]

How does an automatic IRA work? When a worker is hired in a state with such a program, if their employer does not offer a retirement plan, they would be automatically enrolled in a defined-contribution IRA sponsored by the state and managed by a professional financial services company. Workers would not need to take any action to enroll, and they would be able to opt out at any time. The default contribution is typically 5% of a worker's paycheck. And because it is structured as

an IRA, it is portable—meaning employees can keep their retirement plan even if they change employers.

Estimates show that over 1 million Indiana residents lack retirements savings. An automatic IRA could go a long way toward closing that gap. Based on states that have adopted them, about 70% of workers enrolled in an automatic IRA plan remain enrolled.[97]

Costs are minimal, meanwhile. Because the program is a defined-contribution plan, it doesn't rely on long-term public funding—it's all employees' money. Ultimately, the program is self-sustaining, funded through a very modest retirement fund management fee on participants. Other states have issued general fund loans to the pay for startup costs such as outreach and education efforts, personnel, and implementation costs, with the funds paid back when the program has enough enrollees to pay for itself. Indiana could allocate $6 million as a general fund loan to cover startup costs, to be reimbursed once the program is self-sustaining.[98]

The Indiana General Assembly has, in recent years, considered legislation that would create a state-backed IRA program. The Hoosier Employee Retirement Option (HERO) plan, introduced in 2015 by a bipartisan group of lawmakers led by Republican Representative Matt Lehman and Republican Senator Greg Walker, would create a portable IRA program for employees who do not have access to a retirement plan through their employer.[99] The General Assembly could revive the HERO plan, with the amendment that enrollment be made automatic for workers at companies that do not offer an employer-sponsored retirement plan.

Other policy opportunities

While these policy options would be a good start, they would not solve all of the gaps in good jobs that Indiana faces. So, in addition, the state might want to examine a number of other policies in the coming years to boost Hoosiers' income and support Indiana's attractiveness for families.

One possibility would be to explore steps to **enact statewide paid sick and family leave** so as to give all Hoosiers benefits similar to what state employees currently receive.[100] During the pandemic, many learned as never before about the frequent impossibility of reconciling work, caregiving, and financial survival.[101] Likewise, Indiana could also take steps to respond to the rapid growth of temporary and contingent work in the state, which frequently falls short of good quality. One way to do that would be to **provide basic benefits and protections for contingent workers, gig workers, and independent contractors** such as an eligibility for workers' compensation. The state could likewise make any new safety net programs—such as a Medicaid buy-in, paid leave, and automatic IRA—accessible to contingent workers, gig workers, and independent contractors. A complementary policy would be to **enact protections for temporary and on-call workers** to ensure that those jobs more closely resemble good jobs. These could include requiring that temporary workers receive equal treatment in wages and benefits to permanent workers, or a fair-scheduling law that provides shift workers with at least a week's notice of their schedule and requires time-and-a-half for any changes made within a week of a shift.

Estimates show that over 1 million Indiana residents lack retirements savings. An automatic IRA could go a long way toward closing that gap.

Regional and business strategies for turning more jobs into 'good' jobs

Local organizations and businesses can also move on their own to turn more jobs into "good" jobs, whether through efforts to support good wages or initiatives aimed at providing educational pathways and supportive services for working families**.**

In Indiana, several noteworthy initiatives highlight such leadership, and suggest the time is right for firms and communities to recognize that increasing the number of good jobs in firms can serve both hard business purposes as well as altruism, given that such initiatives can at once reduce costs from employee turnover, increase revenue through better execution, improve labor productivity, and deliver reputational benefits.

Supporting good wages

Indiana's private sector obviously has a role to play in boosting the state's job quality, and some firms have shouldered that responsibility impressively in recent years. In the wake of the Brookings 2018 report "Advancing Opportunity in Central Indiana," for example, the Central Indiana life insurance company OneAmerica moved to introduce a new program, OneAmerica Pathway to a Sustainable Income, which allows its lowest-paid employees to earn at least $37,440 annually—meeting the Brookings "good job" criteria. Overall, OneAmerica identified 104 positions that did not meet the threshold, and promised that associates with three years of strong performance would see their total cash compensation move to at least $37,440.

Providing educational pathways and supportive services

For its part, Bloomington-based Cook Medical recently announced its own bold inclusive-growth venture: the location of a $15 million medical device manufacturing facility in a largely Black neighborhood on the northeast side of Indianapolis. There, Cook has partnered with Goodwill of Central & Southern Indiana, the Indianapolis Foundation, IMPACT Central Indiana, and the United North East Community Development Corp. to build the facility and hire 100 employees for jobs expected to pay an average hourly wage of $16 plus benefits. Because the facility's workers will be employed by Goodwill, they will receive wraparound services such as credit counseling and aid in finding housing and transportation. In addition, workers will be able to pursue a high school diploma, bachelor's degree, and master's degree through a free program offered by Cook. Said Pete Yonkman, president of Cook Medical and Cook Group: "This is not just a new manufacturing facility. We've tried to take a holistic approach here to finding a way to create real opportunity for people."

Ideally, such leadership will set a tone statewide and touch off a "race to the top" on job quality among firms and regional organizations. Several encouraging signs of how interest can spread comes from Southwest Indiana. Evansville's Old National Bank, for example, is also moving to adopt a living wage program that looks to accelerate wage growth at the bank for the next three years. Beyond that, the Evansville business community's broader Talent 2025 plan calls for the region to "plan and implement solutions to raise at risk residents to self-sufficiency."

Relatedly, local economic development organizations around the state can and should take their own decisive actions to promote good-job growth. A case in point of such leadership is the city of Indianapolis' inclusive incentives initiative. In 2019, Indianapolis and Develop Indy announced an alignment of their economic development practices with their economic values by requiring that two of the city's primary tax abatements to firms support only good jobs that pay at least $18 an hour and include health care benefits. Jobs that do not pay $18 an hour are not counted in the evaluation of the incentive application unless they are used to hire workers from an underrepresented population, such as returning citizens. In addition to the hourly wage requirement, firms receiving Indianapolis abatements must also dedicate 5% of their total award to dedicated employee accounts to be used on training, transit, or child care needs. Such requirements assert the city's prioritization good-jobs creation without harming the economy. The city has received a positive response since enacting its job quality provisions and has continued to make incentive deals under the new framework. In fact, despite the economic uncertainty created by the pandemic, Indianapolis and Develop Indy announced that 2020 saw economic development deals totaling $1.4 billion in capital investment and over $728 million in real estate development across Marion County.[102]

Today, emerging from an unprecedented set of crises, Indiana faces urgent economic challenges that go beyond just hoping for a decent recovery from the pandemic recession.

Despite having started well with its recovery, the state needs to go farther and work harder to revitalize its large advanced-industry sector. It needs to promote adaptation among its firms and workers. And it needs to address what a previous Brookings report called the "staggering deficit of opportunity" that ensures that "too many jobs offer too little opportunity for workers to reach the middle class."

None of this work will be easy or cheap. Yet while the task may seem daunting, Indiana possesses many enviable starting points for carrying out the necessary tasks.

Though the state faces challenges, its continued specialization in advanced industries—starting with the life sciences and extending through its deep manufacturing sector—represents a crucial source of know-how, leadership, competitive zeal, and good jobs. Indiana also boasts a deep bench of highly engaged public servants, civic leaders, regional intermediaries, and institutions already committed to action and improvement. Regional economic development and industry groups are already developing capacity and approaches for tackling aspects of the core problems. What's more, the past year of crises has, if anything, stimulated the emergence and creativity of community groups, economic growth organizations, workforce intermediaries, and education leaders in every region.

Given all of that, it's time for Indiana to earnestly begin the work of changing its economic trajectory. In the past, Hoosiers have built much to be proud of. Surely, they can do it again.

APPENDIX A: DATA AND ANALYSES

This report analyzes standard labor market and economic-performance indicators (at both long- and shorter-term timeframes) as well as nonstandard measures of various other labor market and economic factors.

These measures reflect three main sorts of information: 1) pre-recession trends; 2) recession impacts; and 3) data on additional topics reflective of economic and labor market change in the age of disruption. What follows discusses the main data underlying the project, notes key sources, and, where needed, describes the methodology behind its development or use.

PRE-RECESSION TRENDS (2007 TO 2019)

To study medium- and longer-term pre-recession trends in Indiana—especially covering the last decade—the analysis relies on both standard and customized measures focused on three particular aspects of the Indiana economy:

Employment and earnings: Data on employment and earnings were obtained from Emsi (the labor market analytics firm) at the four-digit NAICS industry level. Employment totals and trends as well as aggregate and industry-specific wage and salary data were collected for all states, Indiana, and its 11 regions. Earnings per worker was calculated using total annual wages divided by the total number of workers within the industry, adjusted using the Bureau of Economic Analysis' (BEA) price index in the corresponding year. Employment and earnings data for advanced industries were further grouped together to aggregate data from counties into regions for regional and state comparisons.

Productivity: Drawing upon data from both BEA and Emsi, productivity is a key economic indicator that measures economic output per worker. Productivity by sector was calculated using GDP data from BEA divided by the total employment by sector, obtained from Emsi. To calculate the productivity of advanced industries, a Gross Regional Product dataset obtained from Emsi was used to supplement BEA's GDP data in order to impute advanced industries GDP; the productivity calculation then followed as above.

Advanced industries: Industries were identified as "advanced" for this report using two criteria: 1) industry-level R&D spending per worker must fall in the 80th percentile of industries or higher, and so exceed $3,200 per worker; and 2) the share of the industry's workers whose occupation requires a high degree of STEM knowledge must exceed the national average of 20% of workers. 46 industries in Indiana meet this threshold, including 36 manufacturing, two energy, and nine service industries. Indiana's energy industries are so small that they are set aside. A detailed methodology can be found in the related 2015 report from Brookings, "**America's Advanced Industries: What They Are, Where They Are, and Why They Matter**."

Good jobs: In keeping with previous Brookings work on job quality, this report stipulates that "good jobs" meet two criteria. A good job: 1) pays an annual wage of at least $40,700 a year, adjusted for regional cost of living; and 2) provides employer-sponsored health insurance. Brookings' estimates are based on the share of workers in each state employed in a good job on five-year pooled samples from the American Community Survey for

2008-12 and 2014-18. A worker was identified as in a good job if her self-reported annual wage income, adjusted using the BEA's Regional Price Parity indices, was equivalent to at least $40,700 a year in a full-time, full-year position (which comes to $19.50 an hour for 2,087 hours a year) and if she received health insurance through her employer. With that said, it is not possible to determine whether a worker had health insurance through their own employer or their spouse's, nor can we know if a worker is receiving wage income from multiple jobs. These estimates should therefore be thought of as upper limits on the true share of workers in a good job. For additional background on a similar definition, developed for Central Indiana, see the 2018 Brookings report, **"Advancing Opportunity in Central Indiana."**

RECESSION TRENDS (2020)

To provide a high-level view of trends during the COVID-19 pandemic recession, the analysis focused on employment, unemployment, and job postings changes.

Employment: Data on aggregate and industry-specific nonfarm employment in 2020 were retrieved from the BLS Current Employment Statistics program.

Unemployment: Unemployment rates for the months between February and November 2020 were retrieved from the BLS Local Area Unemployment Statistics, which measure the percentage of people in the region who are actively looking for work but do not have jobs.

Job postings: Data on unique job postings comes directly from Emsi. The job postings indicator measures the number of de-duplicated job vacancy advertisements in any given month. The county-level job postings data were aggregated up to the regional level and are available from February to December 2020.

TOPICS

Finally, the analysis employs a variety of mostly nonstandard measures for exploring multiple topics reflective of how technology is transforming Indiana's economy and world of work. These measures cover multiple factors of production and work, as follows:

Automation: The automation potential of occupations, industries, and geographies measures the share of occupations' task content that could be automated with current technologies in each case. A detailed methodology and extensive data can be found in the related 2019 report from Brookings, "**Automation and Artificial Intelligence: How machines are affecting people and places**."

Remote work: To estimate the number of Hoosiers in "teleworkable" occupations, we adopted methodology used by **Dingel and Neiman (2020)** and rely on the BLS Occupational Employment Statistics and the O*NET database to identify teleworkable occupations.

Digitalization: The "digital score" indicator—developed by Brookings—measures the overall digital content and knowledge requirements of all occupations, based on detailed survey information from O*NET, a product of the U.S. Department of Labor Employment and Training Administration. To explore the spread of digital adoption, 2012 and 2019 occupation-specific digital scores were calculated to complement data for the years 2002 to 2016. A detailed methodology and extensive data reporting the digital scores of detailed occupations, large metropolitan areas, and states in 2002 and 2016 can be found in the 2017 Brookings report, **Digitalization and the American workforce**.

IT and software spending: Analysis of IT and software spending per worker for industries and states were developed using 2016 data from the market research company Harte Hanks. After identifying which firms were advanced based on firm level NAICS classifications, firm-level data were aggregated to industry- and state-level for comparisons of IT investment.

Broadband: Broadband subscription rates by income group in Indiana were calculated using the American Community Survey (ACS) 2018 1-year estimate data prepared by the Integrated Public Use Microdata Sample (IPUMS) at the University of Minnesota. The share of households with broadband subscriptions at census-tract scale was calculated using the ACS 2014-2018 5-year estimate data rather than the 1-year estimate data due to an insufficient number of respondents in smaller geographic areas.

APPENDIX B: **INDIANA REGIONS AS DESIGNATED BY THIS REPORT**

Reflecting local commuting patterns, economic linkages, and the presence of key regional actors, the Indiana GPS Project identified and analyzed 11 Indiana regions, comprised of anywhere from four to 12 counties each. What follows is additional information about each region, including a listing of the counties, cities, and towns included in each region, key regional and economic development actors, and brief information on each region's economic character.

NORTHWEST INDIANA (EAST CHICAGO/ GARY/HAMMOND)

For the purposes of the GPS Project, Northwest Indiana includes six counties: Jasper, Lake, LaPorte, Newton, Porter, and Starke. This area includes four counties from the Chicago metro area (Jasper, Lake, Newton, and Porter) and the Michigan City metro area. "The Region," as it is colloquially known, includes multiple cities that together make up the state's second-largest population center. The Northwest Indiana Forum serves as the regional economic development organization (REDO) for this region (plus Pulaski County) while a portion of the region is also served by the Northwest Indiana Regional Development Authority (RDA), an organization created by state statute in 2005 to facilitate revitalization of Lake and Porter counties.

NORTHERN INDIANA (SOUTH BEND/ ELKHART/MISHAWAKA)

Northern Indiana's South Bend-Elkhart region emerged from Indiana's Regional Cities Initiative with a strong working regional partnership that includes representatives from Elkhart, Marshall, and St. Joseph counties as well as the University of Notre Dame. For the purposes of our study, we have added Fulton County to the region to cover the entirety of the state. The South Bend-Elkhart Regional Partnership is the primary driver of regional development activity as it is both the area REDO and a regional development authority that received state Regional Cities funding. This region includes the Indiana portion of the South Bend-Mishawaka metro area and the entirety of the Elkhart-Goshen metro area as well as the Plymouth micropolitan area.

NORTHEAST INDIANA (FORT WAYNE)

Like South Bend-Elkhart, Northeast Indiana also developed a strong regional partnership in response to the state's Regional Cities Initiative. Approaching 1 million people, the region is anchored by Fort Wayne—Indiana's second-largest city—and includes 11 counties: Adams, Allen, DeKalb, Huntington, Kosciusko, LaGrange, Noble, Steuben, Wabash, Wells, and Whitley. The Northeast Indiana Regional Partnership is the area's key regional development organization as it is both the area REDO and a regional development authority that received state Regional Cities funding. Within the Northeast Indiana Regional Partnership's 11-county territory are the Fort Wayne metro area and the Angola, Auburn, Huntington, Kendallville, Wabash, and Warsaw micropolitan areas.

WABASH HEARTLAND (LAFAYETTE)

The Wabash Heartland is a 10-county region, anchored by the Lafayette metro area and Purdue University, that is pursuing a well-developed and broadly supported

strategy that leverages technological innovation to make the region a global center for digital agriculture and next-generation manufacturing. This strategy is primarily being implemented by the Wabash Heartland Innovation Network (WHIN), an organization focused on furthering economic development in the counties situated between the Indianapolis and Chicago metro areas. WHIN's 10-county region includes the Lafayette-West Lafayette metro area, and the Logansport, Crawfordsville, and Frankfort micropolitan areas, as well as Fountain, Pulaski, and White counties.

EAST CENTRAL INDIANA (KOKOMO/ MUNCIE/ANDERSON)

East Central Indiana includes Blackford, Delaware, Grant, Henry, Howard, Jay, Madison, Miami, Randolph, Tipton, and Wayne counties. While there are nascent regional development efforts focused on parts of this region, including an effort led in part by Ball State University, the GPS Project chose to create a region based on the legacies of and challenges faced by three key population centers: Kokomo, Muncie, and Anderson. Given the similar economic histories of these cities, it stands to reason that each will need to embark on similar redevelopment strategies going forward. The 10 counites in East Central Indiana include the entireties of the Kokomo and Muncie metro areas as well as the Anderson (Madison County) portion of the Indianapolis-Carmel-Anderson metro area. The region also includes the micropolitan areas of Peru, Marion, New Castle, and Richmond.

WEST CENTRAL INDIANA (TERRE HAUTE)

Like East Central Indiana, the counties in West Central Indiana—Clay, Parke, Putnam, Sullivan, Vermillion, and Vigo—is home to nascent regional development efforts intended to address recent economic challenges and ensure a prosperous future. Accelerate West Central Indiana, the area REDO, also serves the counties that make up the Terre Haute metro area—Clay, Parke, Sullivan, Vermillion, and Vigo—plus Putnam and Owen counties. Except for Owen County, which is also part of the Indiana Uplands (described below), we are adopting Accelerate West Central Indiana's service area for our study.

CENTRAL INDIANA (INDIANAPOLIS/ CARMEL/FISHERS)

Central Indiana and Indianapolis—the state's capital and largest city—is home to a diverse concentration of advanced industries, large employers, and several other unique assets that situate it as the state's primary center of economic activity. While the Indianapolis-Carmel-Anderson metro area officially expanded to include Putnam and Brown Counties following the last census, Marion County and the surrounding eight "donut" counties are widely recognized as comprising Central Indiana. The Central Indiana Council of Elected Officials, Indy Chamber, and Indy Partnership (the area REDO) all generally view this nine-county region as Central Indiana. For the purposes of our study, Central Indiana includes only eight counties: Boone, Hamilton, Hancock, Hendricks, Johnson, Marion, Morgan, and Shelby. The remaining donut county—Madison—is included in the East Central region as described above.

INDIANA UPLANDS (SOUTH CENTRAL INDIANA)

An 11-county region, the Indiana Uplands includes unique assets (e.g., Indiana University and the Naval Surface Warfare Center Crane Division) around which a regional economic development strategy has formed and is being ably led by Regional Opportunity Initiatives (ROI). ROI defines the Indiana Uplands as Brown, Crawford, Daviess, Dubois, Greene, Lawrence, Martin, Monroe, Orange, Owen, and Washington counties. This includes the Bloomington metro area as well as one county each from the Indianapolis and Louisville metro areas, as well as the Washington, Bedford, and a portion of the Jasper micropolitan areas.

SOUTHEAST INDIANA

Southeast Indiana includes Rush, Fayette, Union, Bartholomew, Decatur, Franklin, Jackson, Jennings, Ripley, Dearborn, Ohio, and Switzerland counties. This region is home to significant corporate interests in Columbus, Greensburg, and Batesville, yet has no clear geographic center as it is situated between three major population centers (Indianapolis, Cincinnati, and Louisville). The EcO Network, the largest initiative of the Community Education Coalition, is this area's

primary regional development actor as its service area includes all of (and three counties more than) the region as defined for this study. This includes the Bloomington metro area as well as one county each from the Indianapolis and Louisville metro areas, plus the Washington, Bedford, and a portion of the Jasper micropolitan areas.

SOUTHWEST INDIANA (EVANSVILLE)

Indiana's third-largest city, Evansville, anchors yet another strong regional development collaboration emerging from the Regional Cities Initiative. The Economic Development Coalition of Southwest Indiana serves as the REDO and Regional Cities-funded RDA for Gibson, Posey, Vanderburgh, and Warrick counties. Three of these counties make up the Evansville metro area, while adjacent Gibson County is home to a significant number of manufacturing jobs. For purposes of the Indiana GPS Project, Knox, Pike, Perry, and Spencer counties have been added to the region to ensure coverage of the entire state. Together, these counties include the Evansville metro area, the Vincennes micropolitan area, and part of the Jasper micropolitan area.

SOUTHERN INDIANA (NEW ALBANY/ JEFFERSONVILLE)

For purposes of this project, Southern Indiana includes five counties—Clark, Floyd, Harrison, Jefferson, and Scott—situated along the Ohio River and near Louisville, Ky. In addition to the Indiana potions of the Louisville metro area, this region includes the Scottsburg and Madison micropolitan areas. While its geographic service area is different than the region as defined in this study, the recently formed One Southern Indiana has established itself as the primary driver of regional development in the area.

SELECTED REFERENCES

GPS PROJECT COMPANION RESEARCH

Daniel Cox, Karlyn Bowman, and Jaqueline Clemence. 2020. "Hopes and Challenges for Community and Civic Life: Perspectives from the Nation and Indiana." Washington. American Enterprise Institute.

Kenan Fikri, Rachel Reilly, and Daniel Newman. 2020. "Delivering Opportunity: A Diagnostic and Strategy Playbook to Maximize Indiana's Opportunity Zones." Washington. Economic Innovation Group.

Lyman Stone. 2020. "Time to Choose: Indiana's Decade to Decide its Demographic Future." Washington: American Enterprise Institute.

INDIANA RESEARCH

Conexus Indiana and Center for Excellence in Manufacturing, Indiana University Kelley School of Business. 2020. "Charting Indiana's Path from Early Adoption to Widespread Application of Industry 4.0 Technologies," (Indianapolis: Conexus Indiana.)

Devaraj, Srikant and others. 2020. "How Many School-Age Children Lack Internet Access in Indiana?" (Muncie, IN: Ball State University Center for Business and Economic Research).

Devaraj, Srikant and others. 2017. "How Vulnerable Are American Communities to Automation, Trade, & Urbanization?" (Muncie, IN: Ball State University Center for Business and Economic Research).

Fourth Economy. 2020. "Assessment of Indiana's Manufacturing Innovation and Entrepreneurship Ecosystem," (Pittsburgh: Fourth Economy).

Hicks, Michael J. 2020. "COVID could amplify factory employment trends." *Kokomo Tribune*. September 20.

Hicks, Michael J. and David Terrell. 2017. "Footloose Jobs & Urbanization." Muncie. Ball State University Center for Business and Economic Research.

Hicks, Michael J. and Srikant Devaraj. 2015. "The Myth and the Reality of Manufacturing in America." Muncie and

Indianapolis. Ball State University and Conexus.

Hicks, Michael J. 2016. "Why Have Local Economic Development Efforts Been So Disappointing?" Muncie. Ball State University Center for Business and Economic Research.

——. 2019. "The Use of GDP Data to Analyze Economic Development Priorities." Muncie, IN. Ball State University Center for Business and Economic Research.

Indiana Chamber of Commerce. 2020. "Indiana Vision 2025: A Plan for Hoosier Prosperity." Indianapolis. Indiana Chamber of Commerce.

New America. 2020. "Advancing Youth Apprenticeship in Indiana: The Planning Process and System Building Priorities."

Parilla, Joseph. 2018. "Rethinking Cluster Initiatives: Central Indiana." Washington. Brookings Institution.

Shearer, Chad, Isha Shah, and Mark Muro. 2018. "Advancing Opportunity in Central Indiana." Washington: Brookings Institution.

Slaper, Timothy F. 2018. "Automation and Offshoring in Durable Goods Manufacturing: An Indiana Case Study." *Economic Development Quarterly* 33 (1): 19-38.

Spotlight on Local Recovery Efforts. 2020. "An individualized network for connecting talent with jobs in Central Indiana." Washington. Brookings Institution.

Spotlight on Local Recovery Efforts. 2020. "An Indianapolis Partnership to Provide Loans when Traditional Banks Won't. Washington. Brookings Institution.

State of Indiana. 2020. "A Better Future for Every Hoosier: Indiana's Strategic Workforce Plan."

TEConomy Partners LLC and BioCrossroads. 2020. "Artificial Intelligence and Advanced Analytics in Indiana." Columbus, OH: TEConomy Partners LLC.

TEConomy Partners LLC and Central Indiana Corporate Partnership. 2018. "Clusters & Disruptors: Envisioning Central Indiana's Economic Future in a Time of Change." Columbus. TEConomy Partners LLC.

TEConomy Partners LLC. 2020. "Response and Resilience: Lessons Learned from Global Life Sciences Ecosystems in the COVID-19 Pandemic." Columbus. TEConomy Partners LLC.

TEConomy Partners LLC and PhRMA. 2019. "The Economic Impact of the U.S. Biopharmaceutical Industry: 2017 National and State Estimates." Columbus. TEConomy Partners LLC.

GENERAL

Acemoglu, Daron and Pascual Restrepo, 2017. "Robots and Jobs: Evidence from U.S. Labor Markets," Working Paper 23285. Cambridge. National Bureau of Economic Research.

Atkinson, Robert, Mark Muro, and Jacob Whiton. 2019. "The Case for Growth Centers: How to Spread Tech Innovation Across America." Washington. Brookings Institution and Information Technology and Innovation Foundation.

Autor, David, David Dorn, and Gordon Hanson. 2016. "The China Shock: Learning from Labor Market Adjustment to Large Changes in Trade." *Annual Review of Economics* 8: 205-40.

——. 2015. "Untangling Trade and Technology: Evidence from Local Labor Markets." *The Economic Journal* 125 (May): 621-646.

——. 2013. "The China Syndrome: Local labor market effects of import competition in the United States." *American Economic Review* 103 (6): 2121-68.

Autor, David, Lawrence Katz, and Melissa Kearney. 2006. "The Polarization of the U.S. Labor Market," Working Paper 11986. Cambridge. National Bureau of Economic Research.

Autor, David, Lawrence Katz, and Alan Krueger. 1997. "Computing Inequality: Have Computers Changed the Labor Market?" Working Paper 5956. Cambridge. National Bureau of Economic Research.

Autor, David and others. 2020. "The Work of the Future: Building Better Jobs in an Age of Intelligent Machines" Cambridge: Massachusetts Institute of Technology.

Baily, Martin, James Manyika, and Shalabh Gupta. 2013. "U.S Productivity Growth: An Optimistic Perspective." Washington: Brookings Institution.

Balland, Pierre-Alexandre, David Rigby, and Ronb Boschma. 2015. "The Technological Resilience of U.S. Cities." *Cambridge Journal of Regions, Economy, and Society* 8 (2): 167-184.

Barrero, Jose Maria, Nicholas Bloom, and Steven J. Davis. 2020. "COVID-19 is also a reallocation shock," Working Paper 27137. Cambridge, MA: National Bureau of Economic Research.

Bateman, Nicole and Martha Ross. 2020. "Why has COVID-19 been especially harmful for working women?" Washington. Brookings Institution.

Berube, Alan. 2020. "COVID-19's Third Wave Is Hammering the Midwest." Washington. Brookings Institution.

Berube, Alan, and Nicole Bateman. "Who Are the Workers Already Impacted by the COVID-19 Recession?" Washington. Brookings Institution

Bivens, Josh. 2017. "Inequality is slowing US economic growth." Washington. Economic Policy Institute.

——. 2018. "Recommendations for Creating Jobs and Economic Security in the U.S." Washington. Economic Policy Institute.

Bivens, Josh, Elise Gould, Lawrence Mishel, and Heidi Shierholz. 2014. "Raising America's Pay: Why It's Our Central Economic Challenge." Washington. Economic Policy Institute.

Bivens, Josh, and Lawrence Mishel. 2015. "Understanding the Historic Divergence Between Productivity and a Typical Worker's Pay." Washington. Economic Policy Institute.

Bloom, Nicholas, Raffaella Sadun, and John Van Reenan. 2017. "Management as a Technology?" Working Paper 16-133. Cambridge. Harvard Business School.

Branstetter, Lee G., Matej Drev, and Namho Kwon. 2015. "Get With the Program: Software-Driven Innovation in Traditional Manufacturing," Working Paper 21752. Cambridge. National Bureau of Economic Research.

Bresmahan, Timothy F. 1999. "Computerization and Wage Dispersion: An Analytical Reinterpretation." *Economic Journal* 109 (456): 390–415.

Brynjolfsson, Erik and Lorin Hitt. 2000. "Beyond Computation: Information Technology, Organizational Transformation, and Business Performance." *Journal of Economic Perspectives* 14 (4): 23–48.

Brynjolfsson, Erik, and Shinkyu Yang. 1996. "Information Technology and Productivity: A Review of the Literature." *Advances in Computers* 43: 179-214.

Burning Glass Technologies. 2013. "The Art of Employment: How Liberal Arts Graduates Can Improve Their Labor Market Prospects." Boston. Burning Glass.

——. 2015. "Crunched by the Numbers: The Digital Skills Gap in the Workplace." (Boston. Burning Glass.

——. 2017. "The Digital Edge: Middle Skill Workers and Automation." Boston. Burning Glass.

Casado, Miguel and others. 2020. "The Effect of Fiscal Stimulus: Evidence from COVID-19." Working Paper 27576. National Bureau of Economic Research.

Dingel, Jonathan and Brent Neiman. 2020. "How many jobs can be done at home?" Working Paper 26948. Cambridge. National Bureau of Economic Research.

Doms, Mark. 2005. "The Diffusion of Personal Computers Across the U.S." *Economic Letter.* San Francisco. Federal Reserve Bank of San Francisco.

Donohue, Ryan and Joseph Parilla. 2020. "Deploying Industry Advancement Services to Generate Quality Jobs." Washington. Brookings Institution

Donohue, Ryan, Joseph Parilla, and Brad McDearman. 2018. "Rethinking Clusters." Washington. Brookings Institution.

Donovan, John, and Cathy Benko. 2016. "AT&T's Talent Overhaul." *Harvard Business Review*. October 1.

——. 2020. "The cost of child care in the United States." Washington. Economic Policy Institute).

Farrell, Diana and others. 2020. "Consumption Effects of Unemployment Insurance during the COVID-19 Pandemic." (New York: JPMorgan Chase).

Fishbane, Lara and Adie Tomer. 2019. "Broadband is too important for this many in the U.S. to be disconnected." Washington. Brookings Institution.

Giannone, Elisa. 2017. "Skilled-Biased Technical Change and Regional Convergence." Working Paper. Chicago. University of Chicago.

Godfrey, Les. 2016. "A Primer on Economic Growth, Productivity, and Shared Prosperity." Unaffiliated manuscript.

Goger, Annnelies. 2020. "Turning COVID-19's Mass Layoffs into Opportunities for Quality Jobs." Washington. Brookings

Gould, Elise. 2019. "State of Working America Wages 2019," (Washington, DC: Economic Policy Institute).

Hershbein, Brad and Lisa Kahn. 2018. "Do Recessions Accelerate Routine-Biased Technological Change? Evidence from Vacancy Postings." *American Economic Review* 108 (7): 1737-72.

Houseman, Susan. 2014. "The Role of Manufacturing in a Jobs Recovery." Grand Rapids. W.E. Upjohn Institute for Employment Research.

Jaimovich, Nir and Henry Siu. 2018. "Job Polarization and Jobless Recoveries," Working Paper 18334. Cambridge. National Bureau of Economic Research.

Jaimovich, Nir, and Henry Siu. 2012. "The Trend Is the Cycle: Job Polarization and Jobless Recoveries," Working Paper 18334 (Cambridge, MA: National Bureau of Economic Research).

Jorgenson, Dale and others. 2011. "Information Technology and U.S. Productivity Growth: Evidence from a Prototype Industry Production Account." *Journal of Productivity Analysis* 35 (2).

Korber, Stefan and Rod McNaughton. 2018."Resilience and entrepreneurship: a systematic literature review." *International Journal of Entrepreneurial Behavior & Research*.

Liu, Amy. 2016. "Remaking economic development: The markets and civics of continuous growth and prosperity," (Washington: Brookings Institution).

Malik, Rasheed and others. 2018. "America's Child Care Deserts in 2018" (Washington: Center for American Progress.

Markle Foundation. 2019. "Digital Blindspot: How Digital Literacy Can Create a More Resilient American Workforce." Washington.

Mandel, Michael, and Bret Swanson. 2017. "The Coming Productivity Boom: Transforming the Physical Economy with Information." Washington. The Technology CEO Council.

Manyika, James and others. 2015. "Digital America: A Tale of the Haves and Have-Mores." San Francisco. McKinsey Global Institute.

Manyika, James and others. 2017. "A Future That Works: Automation, Employment, and Productivity." .San Francisco. McKinsey Global Institute.

Manyika, James and others. 2020. "The Social Contract in the 21st Century: Outcomes So Far for Workers, Consumers, and Savers in Advanced Economies." San Francisco. McKinsey Global Institute.

Manyika, James and others. 2011. "Big Data: The Next Frontier for Innovation, Competition, and Productivity." San Francisco. McKinsey Global Institute.

Merisotis, Jamie. 2020. *Human Work in the Age of Smart Machines.* New York Rosetta Books.

Mark Muro, Jacob Whiton, and Robert Maxim. 2019. "What Jobs Are Affected by AI? Better-Paid, Better-Educated Workers Face the Most Exposure." Washington. Brookings Institution

Mark Muro, Robert Maxim, and Jacob Whiton. 2019. "Automation and Artificial Intelligence: How Machines Are Affecting People and Places." Washington. Brookings Institution.

Mark Muro and others. 2017. "Digitalization and the American Workforce." Washington: Brookings Institution.

Muro, Mark, and others. 2015. "America's Advanced Industries: What they Are, Where they Are, and Why They Matter." Washington: Brookings Institution.

Parrott, Sharon, and others. 2020. "Immediate and Robust Policy Response Needed in Face of Grave Risks to the Economy." Washington. Center on Budget and Policy Priorities.

Partridge, Mark D. and Tsvetkova, Alexandra. 2020. "Local ability to rewire and socioeconomic performance: Evidence from US counties before and after the Great Recession," *OECD Local Economic and Employment Development (LEED) Papers* No. 04 (Paris: Organization for Economic Cooperation and Development).

Rothwell, Jonathan. 2013. "The Hidden STEM Economy." Washington. Brookings Institution.

Sandbu, Martin. 2020. *The Economics of Belonging.* Princeton. Princeton University Press.

Scott, Robert, and Zane Mokhiber, 2020. "Growing China Trade Deficit Cost 3.7 Million American Jobs Between 2001 and 2018. Washington. Economic Policy Institute.

Shearer, Chad and Isha Shah. 2018. "Opportunity Industries." Washington. Brookings Institution.

Simmie, James, and Ron Martin. 2010. "The economic resilience of regions: towards an evolutionary approach." *Cambridge Journal of Regions, Economy and Society* 3 (1): 27-43.

Stansbury, Anna, and Lawrence Summers. 2020. "The Declining Worker Power Hypothesis: An Explanation for the Recent Evolution of the American Economy," *National Bureau of Economic Research*, Working Paper 27193.

Ton, Zeynep. 2014. *The Good Jobs Strategy: How the Smartest Companies Invest in Employees to Lower Costs and Boost Profits.* Boston. New Harvest.

Wiel, David. 2014. *The Fissured Workplace.* Harvard University Press.

Van Praag, C. Mirjam and Peter H. Versloot. 2007. "What is the value of entrepreneurship? A review of recent research." *Small Business Economics*.

ENDNOTES

1. See Jessica R. Nicholson and Ryan Noonan, "Manufacturing Since the Great Recession," U.S. Department of Commerce, ESA Issue Brief No. 02-14, June 2014. Manufacturing output and job growth outpaced the economy-wide total in the first five years of the recovery, driven by strong export sales and foreign investment in the sector. Indiana was one of the five states to most benefit from this turnaround, given its deep specialization in transportation equipment manufacturing.
2. David Autor, David Dorn, and Gordon Hanson, "The China Syndrome: local Labor Market Effects of Important Competition in the United States." American Economic Review 103 (6): 2121-2168. See also Daron Acemoglu and others, "Import Competition and the Great U.S. Employment Sag of the 2000s." NBER Working Paper Np. 20395.
3. See Diana M. Pearce, "The Self-Sufficiency Standard for Indiana 2016," (Indianapolis, IN: Indiana Institute for Working Families, 2016). The analysis of residents in struggling families is adapted from the Self-Sufficiency Standard for Indiana, a joint product of the Indiana Institute for Working Families and the University of Washington's Center for Women's Welfare. The self-sufficiency standard seeks to account for variation in living costs and family composition in determining what a minimum sufficient income would need to be for a family to cover its basic living expenses—food, housing, transportation, child care, health care, taxes—while still being able to save enough to deal with unanticipated income shocks like medical emergencies or job loss. For more on how estimates of struggling families were produced, see Chad Shearer, Isha Shah, and Mark Muro, "Advancing Opportunity in Central Indiana," (Washington, DC: The Brookings Institution, 2018).
4. See, for example, Mark Muro and others, "Advanced industries: What they are, where they are, and why they matter." (Washington: Brookings Institution, 2015); Mark Patridge and Alexandra Tsvetkova, "Local ability to rewire and socioeconomic performance: Evidence from U.S. counties before and after the Great Recession." Local Economic and Employment Development (LEED) Papers 2020/04. (Paris: Organization for Economic Co-operation and Development, 2020); and Amy Liu, "Remaking economic development: The markets and civics of continuous growth and prosperity." (Washington: Brookings Institution, 2016).
5. Numerous economists, labor market experts, regional geographers, and others have in recent years embraced the concept of regional "resilience" in considering why some states and regions escape the worst damage of short-run economic shocks while others succumb to deep repeated slides and long-term damage. See important discussions anchored by Ron Martin, including James Simmie and Ron Martin, "The economic resilience of regions: Towards an evolutionary approach." Cambridge Journal of Regions, Economy, and Society 3 (1): 27-43; Ron Martin, "Regional economic resilience, hysteresis, and recessionary shocks." Journal of Economic Geography 11 (4): 417-427;

and Ron Martin and others, "How regions react to recessions: Resilience and the role of economic structure." Regional Studies 50 (4): 561-585.

6. Les Godfrey, "A Primer on Economic Growth, Productivity, and Shared Prosperity." Unaffiliated manuscript. 2016.
7. Ibid. Godfrey mentions 13 factors that influence productivity. One of these is the accumulation of human capital, but among the 12 others are technology, physical capital, scale and specialization, firm organization, resource allocation, firm turnover within industries, competition levels, social openness, demand and supply, the policy environment, institutions, and social capability.
8. It should be acknowledged that in a decade of wage stagnation some analysts and commentators have questioned the canonical relationship of productivity and living standards. Such writers focus on the growing gap between overall productivity growth and the pay of the vast majority of workers since the 1970s. However, the fact remains that while increasingly uneven pay scales within firms have delinked pay from productivity for most workers, productivity remains a prerequisite for medium-term pay growth in firms, industries, and regions. For that reason, Josh Bivens and Lawrence Mishel have written: "Rising productivity in recent decades provide the potential for a substantial growth in the pay of the vast majority workers." They add: "Policies to spur widespread wage growth, therefore, must not only encourage productivity growth (via full employment, education, innovation, and public investment) but also restore the link between growing productivity and the typical worker's pay." See Josh Bivens and Lawrence Mishel, "Understanding the Historic Divergence Between Productivity and a Typical Worker's Pay." (Washington: Economic Policy Institute, 2015). See also recent work from Anna Stansbury and Lawrence Summer," Productivity and Pay: Is the Link Broken?" Working Paper 24165. (Cambridge: National Bureau of Economic Research, 2017).
9. Lyman Stone, "Time to Choose: Indiana's Decade to Decide its Demographic Future." (Washington: American Enterprise Institute, 2020).
10. The remaining 550 Indiana advanced-industries employees work in the advanced-energy sector.
11. The previously cited analyses from the Economic Policy Institute (EPI) as well as Anna Stansbury and Lawrence Summers lay out the story. Both teams confirm that rising productivity in recent decades at times delivered substantial pay growth and continues to provide the potential for substantial pay gains for the vast majority of workers. To the extent productivity growth has lately not delivered such gains, both teams note it owes to other factors, most notably (as suggested by EPI) issues of diminished worker power, corporate governance, or the absence of a minimum wage, See Josh Bivens and others, "Raising America's Pay: Why It's Our Central Economic Policy Challenge." (Washington: Economic Policy Institute, 2014) and Anna Stansbury and Lawrence Summer," Productivity and Pay: Is the Link Broken?" Working Paper 24165. (Cambridge: National Bureau of Economic Research, 2017).
12. See the Methods Appendix in Muro and others, "America's advanced industries: What they are, where they are, and why they matter" for an explanation of how employment multipliers were estimated for the advanced sector. This analysis was updated using the BEA's 2012 national input-output matrix, 2012-13 Consumer Expenditure Survey data, and 2012 corporate tax returns from the IRS.
13. The state completed its recovery in 2018.
14. See Fabian Eckert and others, "Skilled Tradable Services: The Transformation of U.S High-Skill Labor Markets." Institute Working Paper 25. (Minneapolis: Federal Reserve Bank of Minneapolis, 2019).
15. Real-time online job postings signal intent to hire, serving as a leading indicator of employment trends. However, some industries, especially those involving manual labor, are less likely to advertise vacancies online while others, including certain IT occupations, leave postings up even when not hiring. Online job postings are not a perfect indicator of labor market conditions but give us the most recent granular look at labor demand. See Emsi, "Contextualizing

Labor Market Data: Real-Time and Traditional," **https://www.economicmodeling.com/wp-content/uploads/2018/02/EMSI_Contextualizing_Real_Time_Report_2015.pdf**, March 2015 for a breakdown of the strengths and weakness of the job postings analytics used here.

16. Mark Muro, Robert Maxim, and Jacob Whiton, "The robots are ready as the COVID-19 recession spreads." *The Avenue.* March 24, 2020.
17. Data from Emsi show job postings rose for Indiana Uplands' pharmaceutical and medicine manufacturing sector by 94% between February and December 2020, while job postings in medical equipment and supplies manufacturing shrank by 35% in Southeast Indiana.
18. Job postings in advanced services in West Central Indiana increased by 76% between February and December 2020, while postings in advanced manufacturing in the region declined 29% over the same period.
19. Advanced manufacturing postings in East Central Indiana decreased 26% between February and December.
20. Advanced-services postings in the Indiana Uplands declined 19% between February and December 2020.
21. José María Barrero, Nick Bloom, and Steven J. Davis, "COVID-19 is also a reallocation shock" (Washington: Brookings Institution, 2020).
22. Ibid.
23. Gabriel Chodorow-Reich and John Coglianese, "Projecting Unemployment Durations: A Factor-Flows Simulation Approach with Application to the COVID-19 Recession." Working paper.
24. Tomaz Cajner and others, "The U.S. Labor Market During the Beginning of the Pandemic Recession," NBER Working paper 27159 (Cambridge, MA: National Bureau of Economic Research).
25. Shakkira Harris, "41% of Indiana restaurants 'unlikely' to still be open in six months, survey finds," *WRTV*, September 22, 2020.
26. Michael Hicks, "COVID could amplify factory employment trends," *Kokomo Tribune*, September 20, 2020.
27. Joni Sweet, "Companies that are hiring during COVID-19," *KAKE ABC*, May 15, 2020.
28. Associated Press, "Indiana Boat Business See Coronavirus Business Boost," *US News and World Report*, July 25, 2020.
29. Alex Brown, "JCPenney to Close Indiana Stores." *Inside Indiana Business,* June 4th, 2020.
30. Alexandria Burris, "Walmart building fulfillment center in Hancock County, creating up to 1,000 new jobs." *The Indianapolis Star,* September 24, 2020.
31. See, for example, Josh Bivins, "Inequality is slowing U.S. economic growth." (Washington: Economic Policy Institute, 2017).
32. See Chapter 5, "The Economic Cycle," in Heather Bushey, *Unbound: How Inequality Constricts Our Economy and What We Can Do About It."* (Cambridge: Harvard University Press, 2019). See, also, Karen Dynan, Jonathan Skinner, and Stephen Zeldes, "Do the Rich Save More?" *Journal of Political Economy* 112 (2): 397-444.
33. See Elise Gould, "State of Working America Wages 2019," (Washington, DC: Economic Policy Institute, 2019). Authors extended Gould's analysis of real consumer average hourly compensation to include 2019 data.
34. See Chad Shearer and Isha Shah, "Opportunity Industries," (Washington, DC: The Brookings Institution, 2018) and Chad Shearer, Isha Shah, and Mark Muro, "Advancing Opportunity in Central Indiana."
35. Daniel Cox, Karlyn Bowman, and Jaqueline Clemence, "Hopes and Challenges for Community and Civic Life: Perspectives from the Nation and Indiana." (Washington: American Enterprise Institute, 2020).
36. The General Motors auto manufacturing facility in Kokomo has been producing ventilators in response to the coronavirus pandemic. See Michael Wayland, CNBC, "GM facility to continue building ventilators

after completing $489.4 million government contract," August 2020, **https://www.cnbc.com/2020/08/12/gm-facility-to-build-ventilators-following-489point4m-contract-ending.html**.

37. See Mark Muro and others, "Digitalization and the American Workforce." (Washington: Brookings Institution, 2017).

38. Ibid.

39. Digitalization scores in this section were calculated using the same method employed in Muro and others, "Digitalization and the American Workforce." In brief, survey responses in the O*NET database were used to determine the relative digital intensity of every occupation. Those intensities were then used to calculate an employment-weighted mean digital score for each industry and state using Occupational Employment Statistics data. Since 2012, the OES has produced experimental research data on the occupational structure of industries within states. These were used to calculate state-specific mean digital scores by industry sector and advanced-industries subsectors.

40. Statistical analysis confirms that while part of higher-digital jobs' economic reward owes to the higher education levels of those who often occupy them, not all of it does. Rather, statistical analysis shows that the job market pays a statistical wage premium for digital work. To learn this, Brookings ran regression analyses to compare the average annual wage of 545 occupations with their digitalization scores, while controlling for the education level required by each occupation. The result: Digitalization scores have significant and positive effects on real annual wages even when controlling for education level. And the effect has been growing. For more see Muro and others, "Digitalization and the American Workforce."

41. See Conexus Indiana and the Center for Excellence in Manufacturing, "Charting Indiana's Path from Early Adoption to Widespread Application of Industry 4.0 Technologies." (Indianapolis: Conexus Indiana, 2020).

42. This data is based on a nationally representative survey of establishments across a variety of topic areas related to technology use and planned IT expenditures. All observations are coded by firm, address, industry, and firm and establishment employment level.

43. Digitalization scores in this section were calculated using the same method employed in Muro and others, "Digitalization and the American Workforce." In brief, survey responses in the O*NET database were used to determine the relative digital intensity of every occupation. Those intensities were then used to calculate an employment-weighted mean digital score for each industry and state using Occupational Employment Statistics data. Since 2012, the OES has produced experimental research data on the occupational structure of industries within states. These were used to calculate state-specific mean digital scores by industry sector and advanced-industries subsectors.

44. Lara Fishbane and Adie Tomer, "Broadband is too important for this many in the U.S. to be disconnected." (Washington: Brookings Institution, 2019). Among other items Fishbane and Tomer cite: Aaron Smith, "Lack of broadband can be a key obstacle, especially for job seekers." (Washington: Pew Research Center, 2015); Alice Nakamura and others, "Jobs Online" in David Autor, *Studies of Labor Market Intermediation.* (Chicago: University of Chicago Press, 2009); and Daniel Boothby, Anik Dufour, and Jianmin Tang, "Technology adoption, training, and productivity performance." *Research Policy* (2010).

45. See Boothby, Dufour, and Tang, "Technology adoption, training, and productivity performance" and Nakamura and others, "Jobs Online." One paper even suggests that the ease of online job searches may help reduce discouragement among job seekers. See Randolph Beard, George Ford, and Richard Saba, "Internet Use and Job Search." (Washington: Phoenix Center for Advanced Legal and Economic Policy Studies, 2010).

46. Srikant Devaraj and others, "How Many School-Age Children Lack Internet Access in Indiana?" (Muncie: Ball State University, 2020).

47. Brookings analysis of ACS 1-year data.

48. Brookings analysis of ACS 1-year data.

49. Devaraj and others, "How Many School-Age Children Lack Internet Access in Indiana?"

50. Indiana-specific data on discouraged workers is difficult to ascertain, as the BLS Alternative Measures of Labor Underutilization for States dataset, which analyzes state-level labor market changes, uses data averaged over four quarters. Indiana state-level data on discouraged workers did not show an increase in the four-quarter period ending in the third quarter of 2020 when compared to the equivalent period in 2019 (even as other indicators in the dataset, such as the number of job losers and number of workers unemployed for 15 weeks or longer, increased). The use of a moving average, combined with the need for workers to remain attached to the labor market to continue receiving unemployment insurance benefits, may have contributed to the data showing negligible change. However, national Current Population Survey data on discouraged workers, which are released monthly, showed a 62% increase in discouraged workers nationwide, equal to an increase in 252,000 discouraged workers nationally. This implies there was likely at least some increase in discouraged workers in Indiana, but which may not yet be reflected in state-level estimates.

51. Nicole Bateman and Martha Ross, "Why has COVID-19 been especially harmful for working women?" (Washington: Brookings Institution, 2020). While there are not definitive state-level estimates of the number of women who have dropped out of the workforce due to child care issues, some have attempted to estimate national-level data. For example, economist Ernie Tedeschi estimates that as many as 1.6 million fewer mothers were in the labor force in September 2020 than in February of that year; see Ernie Tedeschi, "The Mystery of How Many Mothers Have Left Work Because of School Closings," *The New York Times*, October 29, 2020. A more conservative estimate could be determined by measuring the increase in the number of women who have left the labor force for "other" reasons between February and November 2020, which, according to BLS, is primarily composed of "those who did not actively look for work in the prior 4 weeks for such reasons as child-care and transportation problems." That number is around 219,000 based on BLS data (see: **https://beta.bls.gov/dataViewer/view/timeseries/LNU05027700**). Meanwhile, a Census Bureau analysis found that nearly one in three women who were not working in 2020 had stopped working due to child care demands; see: Misty L. Heggeness and Jason M. Fields, "Working Moms Bear Brunt of Home Schooling While Working During COVID-19" (Washington: Bureau of the Census, 2020).

52. Rasheed Malik and others, "America's Child Care Deserts in 2018" (Washington: Center for American Progress, 2018). More info, including additional Indiana-specific data, can be found at **https://childcaredeserts.org/**.

53. Economic Policy Institute, "The cost of child care in the United States" (Washington, 2020). More info, including additional Indiana-specific data, can be found at **https://www.epi.org/child-care-costs-in-the-united-states/**.

54. See Amanda Taub, "Pandemic Will 'Take Our Women 10 Years Back' in the Workplace," *The New York Times*, September 26, 2020; see also Patricia Cohen, "Recession With a Difference: Women Face Special Burden," *The New York Times*, November 17, 2020.

55. Brookings analysis of BLS Local Area Unemployment Statistics Alternative Measures of Labor Underutilization for States data. BLS uses four-quarter moving averages to increase the reliability of Current Population Survey estimates, which are based on relatively small sample sizes at the state level, and to eliminate seasonality. In the four-quarter average that encompassed all of 2019, there were 72,400 Indiana workers who involuntarily entered into part-time employment. In the four-quarter average from the fourth quarter of 2019 to the third quarter of 2020, that number rose to 114,000 workers.

56. See, for example, Autor, Dorn, and Hanson, "The China Shock: Learning from Labor Market Adjustment to Large Changes in Trade," *Annual*

Review of Economics (2016).

57. To assess Indiana employment effects associated with imports from China, this analysis employs data from Autor, Dorn, and Hanson, "The China Syndrome" (2013) to examine trade shocks by commuting zone with causal estimates from the effect of those shocks on manufacturing employment from Autor, Dorn, and Hanson, "The China Shock" (2016). The analysis takes the aggregate change in manufacturing employment due to Chinese import competition in each commuting zone. Note that this analysis is the average local effect of import competition and does not take into account employment effects of trade between commuting zones. See Autor, Dorn, and Hanson, "The China syndrome: Local labor market effects of import competition in the United States," *American Economic Review* (2013) and Autor, Dorn, and Hanson, "The China shock: Learning from labor-market adjustment to large changes in trade," *Annual Review of Economics* (2016).
58. Scott and Mokhiber "Growing China trade deficit cost 3.7 million American jobs between 2001 and 2018," (2020) estimates the net job loss due to trade as employment declines from import exposure from China minus the corresponding employment gains from export exposure. See Robert E. Scott and Zane Mokhiber, "Growing China trade deficit cost 3.7 million American jobs between 2001 and 2018," (Washington: Economic Policy Institute, 2020).
59. While the U.S. and Indiana may benefit from the cheaper goods made available through imports and the jobs created by exports, evidence from the rise in trade with China since the 2000s suggests that the gains from trade have been slow to materialize in the local labor markets hit the hardest as labor demand adjusts slowly and unevenly. See David Autor, David Dorn, and Gordon H. Hanson, "The China shock: Learning from labor-market adjustment to large changes in trade," *Annual Review of Economics* (2016).
60. Very appropriately, the disparate and interrelated impacts of globalization and automation emerged in recent years as central topics of national and Indiana economic analysis. In 2016, research by economists David Autor, David Dorn, and Gordon Hanson in "The China Shock" (2016) prompted significant new concern about the gravity of Chinese import competition on trade-intensive localities, while in 2017, Daron Acemoglu and Pascual Restrepo stressed that robots and other computer-assisted technologies pose a threat to the future of jobs and wages. See Autor, Dorn, and Hanson, "The China Shock: Learning from Labor Market Adjustment to Large Changes in Trade," *Annual Review of Economics* (2016) and Acemoglu and Restrepo, "Robots and Jobs: Evidence from U.S. Labor Markets." NBER Working Paper No. 23285 (Cambridge, MA: National Bureau of Economic Research, 2017). Additional work by Autor, Dorn, and Hanson sought to disentangle the various effects of the two forces: trade and technology. See Autor, Dorn, and Hanson, "Untangling Trade and Technology: Evidence from Local Labor Markets," *The Economic Journal* (2015). Simultaneously, Indiana scholars have sought to disentangle the employment impacts of trade and tech. In 2015, Michael Hicks and Srikant Devaraj concluded that the dominant source of job losses in the U.S. manufacturing in the years 2000 to 2010 was productivity gains in American factors, including from automation. In contrast, Timothy Slaper concluded that "offshoring"—that is, trade—was the primary driver for employment losses and productivity gains in Indiana manufacturing, not automation. See Michael Hicks and Srikant Devaraj, "The Myth and the Reality of Manufacturing in America," (Muncie and Indianapolis: Ball State University and Conexus, 2015) and Timothy Slaper, "Automation and Offshoring in Durable Goods Manufacturing: An Indiana Case Study." *Economic Development Quarterly* (2018).
61. Mark Muro, Robert Maxim, and Jacob Whiton, "Automation and Artificial Intelligence: How Machines Are Affecting People and Places." (Washington: Brookings Institution, 2019).
62. Mark Muro, Robert Maxim, and Jacob Whiton, "The robots are ready as the COVID-19 recession spreads." (Washington: Brookings Institution, 2020).
63. See, for example, Nir Jaimovich and Henry Siu, "Job

Polarization and Jobless Recoveries." NBER Working Paper No. 18334, (Cambridge, MA: National Bureau of Economic Research, 2018) and Brad Hershbein and Lisa Kahn, "Do Recessions Accelerate Routine-Biased Technological Change? Evidence from Vacancy Postings." *American Economic Review* (2018).

64. See for example, Stefan Korber and Rod McNaughton, "Resilience and entrepreneurship: a systematic literature review." *International Journal of Entrepreneurial Behavior & Research* (2018); Simon C. Parker, "Theories of entrepreneurship, innovation and the business cycle." *Journal of Economic Survey* (2012); and C. Mirjam Van Praag and Peter H. Versloot, "What is the value of entrepreneurship? A review of recent research." *Small Business Economics* (2007).
65. Personal communication from Kenan Fikri, director of research and policy development, Economic Innovation Group, February 8, 2021; see also Kenan Fikri, Rachel Reilly, and Daniel Newman, "Delivering Opportunity: A diagnostic and strategy playbook to maximize Indiana's Opportunity Zones" (Washington: Economic Innovation Group, 2020).
66. Ibid.
67. Lyman Stone, "A Time to Choose: Indiana's Decade to Decide its Demographic Future" (Washington: American Enterprise Institute, 2020).
68. See appendix file from Sifan Liu and Joseph Parilla, "Businesses owned by women and minorities have grown. Will COVID-19 undo that?" (Washington: Brookings Institution, 2020).
69. Chad Shearer, Isha Shah, and Mark Muro, "Advancing Opportunity in Central Indiana." (Washington: Brookings Institution, 2018).
70. Daniel Cox, Karlyn Bowman, and Jaqueline Clemence, "Hopes and Challenges for Community and Civic Life."
71. See Jonathan Dingel and Brent Neiman, "How many jobs can be done at home?" NBER Working Paper No. 26948, (Cambridge, MA: National Bureau of Economic Research, 2020). See, also, Simon Mongey, Laura Pilossoph, and Alex Weinberg, "Which workers bear the burden of social distancing policies?" White paper. (Chicago: Becker Friedman Institute, 2020).
72. Brookings analysis of data from O*NET, the Bureau of Labor Statistics' Occupational Employment Statistics, and Mark Muro and others, "Digitalization and the American Workforce." (Washington: Brookings Institution, 2017). The mean digital skills score of those who can work from home is 53, while the mean digital score of those who cannot work from home is 31.
73. Brookings analysis of Bureau of Labor Statistics' Occupational Employment Statistics and Jonathan Dingel and Brent Neiman, "How Many Jobs Can be Done at Home?" NBER Working Paper No. 26948, (Cambridge, MA: National Bureau of Economic Research, 2020).
74. Brad Hershbein and Lisa Kahn, "Do Recessions Accelerate Routine-Biased Technological Change? Evidence from Vacancy Postings." *American Economic Review* (2018).
75. See Autor, Dorn, and Hanson, "The China Shock: Learning from Labor Market Adjustment to Large Changes in Trade," *Annual Review of Economics* (2016); Acemoglu and Restrepo, "Robots and Jobs: Evidence from U.S. Labor Markets." NBER Working Paper No 23285 (2017); Autor, Dorn, and Hanson, "Untangling Trade and Technology: Evidence from Local Labor Markets," *The Economic Journal* (2015); Hicks and Devaraj, "The Myth and the Reality of Manufacturing in America," (Muncie and Indianapolis: Ball State University and Conexus, 2015); and Slaper, "Automation and Offshoring in Durable Goods Manufacturing: An Indiana Case Study," *Economic Development Quarterly* (2018).
76. To assess Indiana wage effects associated with imports from China this analysis employs data from Autor, Dorn, and Hanson, "The China Syndrome" (2013) to examine trade shocks by commuting zone with causal estimates from the effect of those shocks on wages from Autor, Dorn, and Hanson, "The China Shock" (2016). The analysis takes the weighted average by 1990 population of the change in wages due to Chinese import competition in

each commuting zone. Note that this analysis is the average local effect of import competition and does not take into account wage effects of trade between commuting zones. Wage decline is reported in 2020 dollars. See Autor, Dorn, and Hanson, "The China syndrome: Local labor market effects of import competition in the United States," *American Economic Review* (2013) and Autor, Dorn, and Hanson, "The China shock: Learning from labor-market adjustment to large changes in trade," *Annual Review of Economics* (2016).

77. Data from Marchio and Parilla, "Export Monitor 2018," (Washington: Brookings, 2018).
78. These findings suggest a quite significant decline in wages due to automation. Acemoglu and Restrepo (2017) find that robot exposure in local labor markets leads to a decline in employment and wages. Within a given commuting zone, one more robot per 1,000 workers is associated with a 0.73% decline in wages. Their theoretical model suggests a smaller but still significant effect of robot exposure aggregated across larger geographic areas, such as states. See Daron Acemoglu and Pascual Restrepo, "Robots and jobs: Evidence from the US," NBER Working Paper No 23285 (2017).
79. See Mark Muro, Robert Maxim, and Jacob Whiton, "Automation and Artificial Intelligence: How machines are affecting people and places," (Washington: Brookings, 2019); Richard Dietz and James Orr, "A Leaner, More Skilled U.S. Manufacturing Workforce," *Federal Reserve Bank of New York, Current Issues in Economics and Finance* (2006); and David Autor, David Dorn, and Gordon Hanson, "Untangling Trade and Technology: Evidence from Local Labor Markets," *The Economic Journal* (2015).
80. See Mark Muro, Robert Maxim, and Jacob Whiton, "Automation and Artificial Intelligence: How machines are affecting people and places," (Washington: Brookings, 2019).
81. David Wiel, *The Fissured Workplace,* Harvard University Press, 2014.
82. Stansbury, Anna, and Lawrence Summers, "The Declining Worker Power Hypothesis: An Explanation for the Recent Evolution of the American Economy," *National Bureau of Economic Research*, Working Paper 27193, (2020).
83. Brookings analysis of IPUMS-CPS microdata.
84. December data from the Kaiser Family Foundation estimates that between 2 and 3 million workers lost employer-sponsored coverage nationwide between March and September 2020, see Daniel McDermott and others, "How Has the Pandemic Affected Health Coverage in the U.S.?" (San Francisco: Kaiser Family Foundation, 2020). While Kaiser does not break out state-level data, earlier estimates from health advocacy group Families USA found that from February to May 2020, nearly 5.4 million workers nationwide lost employer-sponsored health insurance, including 79,000 in Indiana. See Stan Dorn, "The COVID-19 Pandemic and Resulting Economic Crash Have Caused the Greatest Health Insurance Losses in American History." (Washington: Families USA, 2020). Research from the Economic Policy Institute finds that on average, for every worker who loses employer-sponsored health insurance, two people total lose insurance coverage due to spouses and dependents losing coverage as well. See Josh Bivens and Ben Zipperer, "Health insurance and the COVID-19 shock" (Washington: Economic Policy Institute, 2020).
85. Brian Francisco, "State lags in health care coverage," *The Journal Gazette*, November 8, 2019.
86. Brookings analysis of IPUMS-CPS microdata.
87. Because the state leverages Pell Grants and other federal financial aid funding to cover the costs of most for-credit certifications, the Governor's Workforce Cabinet and Department of Workforce Development are able to stretch that allocation to cover more workers than if the program relied solely on state appropriations. In 2020, Indiana allocated $22 million of CARES Act funding to further bolster the program. However, due to the significant uptick in program usage by unemployed workers, the state has already spent down a significant portion of those dollars. However, the program's existing allocation of federal and state money likely won't be enough to fund it through the entirety of 2021.

Depending on when current funding ultimately ends, the state could face a several month gap in early 2021 where the program won't receive any state funding. In that case, absent a new state appropriation, the program may not be able to support workers enrolling in training who do not qualify for federal financial aid. As such, it's critical that the state maintain its existing funding commitment to the program.

88. **https://www.eitc.irs.gov/eitc-central/statistics-for-tax-returns-with-eitc/statistics-for-tax-returns-with-eitc**.

89. Best estimate based on 9% of the average Indiana federal EITC benefit.

90. Alan Berube, "Want to help the working class? Pay the EITC differently," *The Avenue*, June 28, 2017.

91. For a discussion of the impacts of financial volatility on U.S. workers, see Mark Muro and Clara Hendrickson, "Managing uncertainty: Paycheck volatility demands new responses," *The Avenue*, March 1, 2018.

92. **https://nmtogether4health.org/media-press/new-mexico-families-celebrate-legislatures-funding-medicaid-buy-in/**.

93. **https://leg.colorado.gov/bills/hb19-1004**.

94. Stone, "A Time to Choose."

95. For more information, see David John, "Automatic IRA Builds Retirement Security" (Washington: Heritage Foundation, 2010), J. Mark Iwry and David John, "Pursuing Universal Retirement Security Through Automatic IRAs" (Washington, Brookings Institution, 2007).

96. See "State Initiatives 2021: More New Programs to Launch While Others Consider Action" (Washington: Georgetown University Center for Retirement Initiatives, 2020).

97. For example, an analysis of Oregon's OregonSaves program found that approximately 28% of workers opt out, see: **https://www.oregon.gov/treasury/news-data/Documents/News-and-Data-Treasury-News-and-Reports/2018/2018-OregonSaves-Annual-Report-FINAL.pdf**. In other states, the opt-out rates range from 30% to 35%, see: Tammy La Gorce, "Saving at Work for Retirement: A Perk Coming to More States in 2021," *The New York Times*, December 20, 2020.

98. For example, Oregon provided its automatic IRA program, OregonSaves, with general fund loans of $4 million to pay for services and supplies to get the program running. OregonSaves launched in July 2017 and became self-sustaining two years later, in July 2019. Indiana's labor market is roughly 1.5 times larger than Oregon, so would likely require marginally higher startup costs. For an overview of the general fund loans Oregon provided to OregonSaves, see here: **https://olis.leg.state.or.us/liz/2018R1/Downloads/CommitteeMeetingDocument/146555**. For more information on OregonSaves becoming self-sustaining, see here: **https://olis.oregonlegislature.gov/liz/2019R1/Downloads/CommitteeMeetingDocument/191832** and here: **https://www.plansponsor.com/oregonsaves-reports-progress-filling-retirement-plan-coverage-gap/**.

99. See **http://www.pensionrights.org/issues/legislation/state-based-retirement-plans-private-sector#Indiana**. For the House bill introduced by Rep. Lehman, see: **http://iga.in.gov/legislative/2015/bills/house/1279#digest-heading**. For the companion Senate bill introduced by Senator Walker, see **http://iga.in.gov/legislative/2015/bills/senate/555#digest-heading**.

100. In 2017, Governor Holcomb's administration became a national leader by providing four weeks of paid parental leave to all state employees. State employees likewise have nine days of paid sick leave each year.

101. Stone, "A Time to Choose."

102. Indy Chamber, "PRESS RELEASE: Mayor Joe Hogsett and Develop Indy Report 2020 Economic Development Successes and Unprecedented Small Business Support," January 7, 2021.

ACKNOWLEDGEMENTS

The Brookings Institution is a nonprofit organization devoted to independent research and policy solutions. Its mission is to conduct high-quality, independent research and, based on that research, to provide innovative, practical recommendations for policymakers and the public. As such, the conclusions and recommendations of any Brookings publication are solely those of its authors, and do not reflect the views of the Institution, its management, or its other scholars.

The Brookings Metropolitan Policy Program (Brookings Metro) would like to thank the Central Indiana Corporate Partnership (CICP), BioCrossroads, and the Lilly Endowment Inc. (LEI) for their generous support of this analysis and of Brookings's advanced economy work more broadly.

Sincere thanks for ongoing input and counsel go to David Johnson of CICP as well as to Clay Robbins, Robert Smith, and Jaclyn Dowd at LEI; Jason Kloth of Ascend Indiana; Patty Martin at BioCrossroads; and Mark Howell of Conexus Indiana.

The Brookings team is also grateful to Ryan Streeter of the American Enterprise Institute for his counsel and good cheer.

Additional invaluable input and practical support in Indiana were provided by Lori Leroy, Nathan Ringham, and Melissa Roberts at CICP.

More broadly, the Brookings Metro team has relied on a rich flow—even during the pandemic—of both structured and informal consultation with a helpful, thoughtful, and committed array of Indiana stakeholders.

The GPS Project Advisory Council provided a helpful sounding board throughout the research process and merits our sincere appreciation: Keira Amstutz, Kevin Brinegar, Jaclyn Dowd, Sue Ellspermann, Tim George, Starla Hart, Teresa Lubbers, Justin McAdam, John Ruckelshaus, Robert Smith, and Ryan Streeter.

An outstanding set of regional leaders convened two focus groups in all 11 Indiana regions, read draft material, and merited additional gratitude. These leaders included:

Northwest: Heather Ennis, Jená Bellezza, Linda Woloshansky, Denise Dillard

North: Regina Emberton, Pete McCown

Northeast: John Sampson, Ryan Twiss

Wabash Heartland: Pat Corey, Johnny Park

Central: Mark Fisher

East Central: Delaina Boyd, Tom Kinghorn

West Central: Rob Coons

Southwest: Jim Ryan

Indiana Uplands: Tina Peterson

Southeast: John Burnett, Kathy Oren

South: Linda Speed

And the team relied continuously on the expertise of dozens of committed Hoosiers and others, including: R. Scott Appleby, Desmond Amuh, Regina Ashley, John Axelberg, Bob Behning, Jeanna Berdel, Brad Bishop, Luke Bosso, Stephanie Bothun, Kate Broshears, Caitlin Brown, Bryce Carpenter, Angela Carr Klitzsch, Dawn Clark, Matt Crouch, Jackie Cuellar, Wendy Dant Chesser, Scott Davison, Merritt Dilts, David Ebert, Claire Fiddian-Green, Kenan Fikri, Mark Fisher, Scott Ford, Thomas E. Fuja, Roberto Gallardo, Tom Gates, Jodi Golden, Julie Goodman, Robert Goosen, Nathan Hartman, Brock Herr, Michael Hicks, Mackenzie Higgins, Michael Huber, Kathy Huffman, Saru Jayaraman, Leighton Johnson, Drew Klacik, Mitch Landess, Mike Langellier, Chris R. Lowery, Chauncey Lennon, Douglas Mansfield, Molly Martin, Tony Mason, Konnie McCollum, PJ McGrew, Geoffrey S. Mearns, Jamie Merisotis, Steven Meyer, Blair Milo, Kara Monroe, Paul Mitchell, Ian Nicolini, Ray Offenheiser, Margo Olson, Mark Partridge, Umesh Patel, Charles Penquite, Jr., Tim Raper, Aaron Renn, Joshua Richardson, Brad Rhorer, Denise Riedl, Dave Roberts, Carol Rogers, Scott Rudd, Greg Taylor, Stacy Townsley, Yamila Ruiz, Ken Sauer, Paige Shevlin, Jeffrey H. Smulyan, Brian Stemme, David Terrell, Travis Thiex, Bill Turner, Michael Ursem, Lawrence Walter, Mark Wasky, Chris Watts, and Maureen Weber.

Closer to home, the authors would also like to thank the following colleagues for substantive input: Alan Berube, Annelies Goger, Tracy Hadden Loh, Amy Liu, Joseph Parilla, and Adie Tomer.

In addition, we are grateful for the practical help of Jade Arn, Kim Bright, Michelle Carter, Elizabeth Dang, Anthony Fiano, Alec Friedhoff, Michael Gaynor, Chris Howie, Julia Kraeger, David Lanham, April McWilliams, Erin Raftery, Karen Slachetka, Reda Urmanaviciute, and Luisa Zottis at Brookings.

MORE INFORMATION

About the Indiana GPS Project

Coordinated by the Central Indiana Corporate Partnership (CICP), the Indiana GPS Project is a series of multidimensional reports on Indiana's economy. It is designed to inform public policy and business priorities that will spur economic growth in Indiana, including through recommendations about how to increase the number of good jobs available to Hoosiers. The research project, which began in August 2019, has been spearheaded by CICP and conducted in collaboration with the Brookings Institution's Metropolitan Policy Program and the American Enterprise Institute.

To learn more, visit **Indianagpsproject.com**.

About the Brookings Metropolitan Policy Program

The Brookings Metropolitan Policy Program delivers research and solutions to help metropolitan leaders build an advanced economy that works for all.

To learn more, visit **brookings.edu/metro**

For more information:

Mark Muro
Senior Fellow
Metropolitan Policy Program at Brookings
mmuro@brookings.edu


B
Metropolitan Policy Program
at BROOKINGS