



THE OHIO STATE UNIVERSITY

**Over 40 Years of Ohio Tax Incentive Development Policy:
Have they moved the State's "Economic-Growth Needle?"**

**Mark Partridge*, Amanda Weinstein#, Nick Messenger*, & Sowon Kim*
OSU Swank-Chair Rural-Urban Policy Program*; University of Akron#**

*Presented to JobsOhio and Econ Development Group, Columbus, OH
February 6, 2023*

“Governments don’t know how to pick winners, but losers know how to pick governments” anonymous economist, reflects views of economists

1) Subsidies and Tax Incentives as widely practiced in the US likely reduce US GDP by shifting resources from highest-valued locations based on profits/productivity to locations with less productivity but offer subsidies.

Subsidies create other economic distortions that further reduce national GDP—in Intel’s case Western US natural home.

2) Modern incentives/subsidies began in 1936 with MS’s BAWI. Ohio’s efforts to lure Honda in the late 70s/early 80s nationalized the policy.

3) In fairness, one should call modern subsidy/incentive policies such Ohio’s as the “Mississippi model” as they were the first in the 20th century.



The Verge

People aren't buying as many PCs – and Intel is feeling the multibillion-dollar burn

By SEAN HOLLISTER

Jul 28, 2022, 5:03 PM EDT

Bloomberg

Intel lost half a billion dollars launching its underwhelming GPUs. too

Intel Is Planning Thousands of Job Cuts in Face of PC Slump

By Mark Gurman and Debby Wu

October 11, 2022 at 6:10 PM EDT Updated on October 12, 2022 at

9:35 AM EDT

- Chipmaker may announce move around time of its earnings report
- Companywide cuts will hit sales and marketing especially hard

BUSINESS / INTEL / TECH

Samsung and AMD's profit slump suggests industry trouble for chipmakers

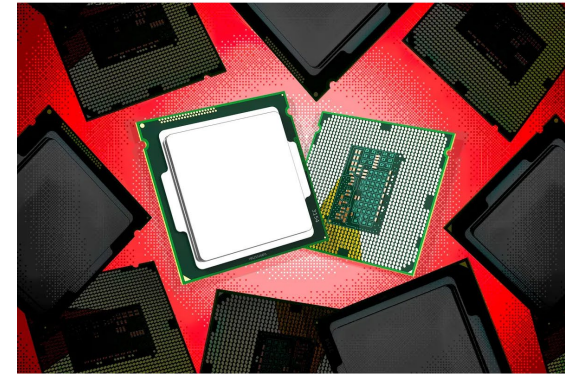


Illustration by Alex Castro / The Verge

/ As demand for PCs, GPUs, and cloud servers falters, Samsung and AMD join Intel and Nvidia with warnings of a growing semiconductor industry sinkhole.

The Verge

Bloomberg

Intel Slashing CEO, Managers' Pay in a Bid to Preserve Cash

- Chipmaker looks to preserve cash for turnaround efforts
- Company's leadership team to have pay reduced by 15%

By Ian King

January 31, 2023 at 9:29 PM EST Updated on February 1, 2023 at 9:41 AM EST



https://www.theregister.com/2022/07/18/intel_arc_gpu_comparison/

Intel's first discrete GPUs won't be a home run

High-end Arc A750 will compete with *checks notes* a GeForce RTX 3060

[Dylan Martin](#)

Mon 18 Jul 2022 // 17:30

The semiconductor giant signaled this on Friday when it said one of its upcoming flagship graphics cards for desktops, the A750, will provide slightly better performance than one of Nvidia's low-end cards with hardware-based real-time ray tracing, the GeForce RTX 3060, across select games.

Quora

Related **Why is TSMC planning to begin the production of 2nm CPUs in 2023, while Intel is planning to begin the production of 2nm CPUs in 2029? Why will Intel wait? Isn't Intel going to lose money, if they wait years before they start producing 2nm CPUs?**

Related **Is Intel falling behind the TSMC?**

They are already behind.

Related **Will Intel die in the next few years?**

The New York Times

Inside Intel's Delays in Delivering a Crucial New Microprocessor

The company grappled with missteps for years while developing a microprocessor code-named Sapphire Rapids. It comes out on Tuesday.

By Don Clark, Jan. 10, 2023

For Intel, the pressure is on. Along with falling demand for chips used in personal computers, the company faces stiff competition in the server chips that are its most profitable business. That issue has worried Wall Street, with Intel's market value plunging more than \$120 billion since Mr. Gelsinger took charge.



<https://www.cnbc.com/2023/01/26/intel-intc-earnings-q4-2022.html>

Intel shares drop on weak quarterly results and expectations for another quarter of losses

PUBLISHED THU, JAN 26 2023 4:20 PM EST | UPDATED THU, JAN 26 2023



Jordan Novet
@JORDANNOVET

Intel's revenue declined 32% year over year in the quarter that ended Dec. 31, according to a statement. It's the fourth consecutive quarter of falling sales as the market for personal computers retreats from the Covid boom.

The company recorded a \$664 million net loss, compared with a profit of \$4.62 billion in the year-ago quarter.

Investors can expect more pain in the first quarter. Intel called for adjusted net loss of 15 cents per share on \$10.5 billion to \$11.5 billion in revenue. Analysts

Business conditions are now "driving near-term under-loading in our factory network," Gelsinger said.

Under-load charges, which accrue when factories are underutilized, narrowed Intel's gross margin in the fourth quarter by 220 basis points (2.2%), David Zinsner, Intel's finance chief, said on the call. In the first quarter the loading issue will hurt gross margin by 400 basis points, Zinsner said.



Economic Development in the 1930s: Balance Agriculture with Industry

by Connie Lester / May 2004

The Mississippi Advertising Commission ran advertisements in publications across the country. This ad, which appeared in the May 1937 edition of Fortune magazine, promoted the state's "friendly, native Anglo-Saxon labor." Courtesy, Mississippi Department of Archives and History

<https://www.mshistorynow.mdah.ms.gov/issue/economic-development-in-the-1930s-balance-agriculture-with-industry>

As they were in the past, such tax schemes are criticized for their socialist-planning tendencies (I think of the Labour gov'ts of the 70s) and crony



For the First Time
**A GREAT STATE OFFERS
PLANNED COOPERATION TO INDUSTRY**

No state in America offers more inspiration to men of Industry than Mississippi. Here, in these modern times, is a virgin industrial state where all producers of goods may come and find unexploited manufacturing opportunities.

So certain are the people of Mississippi that profit awaits those worthwhile industrial enterprises which locate within its borders that they have, by law, devised a plan to share the cost of industrial development in the state. This is not only in the form of tax exemption by municipalities and counties but actual assistance with the cost of land and buildings. This new law, the first of its kind, makes Mississippi an industrial haven for practically every form of industry, to the mutual benefit of both the manufacturer and the community.

Mississippi's greatest industrial attractions are found in the opportunities it offers for low manufacturing costs. The undeveloped resources of the state—the wealth of raw materials; the high percentage of friendly, native Anglo-Saxon labor; the excellent transportation facilities by water, rail, air and bus; the low power rates; the ideal year around climate... Mississippi offers you all of these basic factors to help you lower your manufacturing costs.

Surely, this rich region is deserving of your careful investigation. To assist you, the Mississippi Industrial Commission is ready to supply you, without obligation, a confidential survey based on the needs of your own particular company. This same Commission also stands ready to lend its full cooperation to your company and to the municipality in which you wish to locate.

Steeped in the traditions of the Old South, Mississippi is known as a land where gracious hospitality has always reigned. This same friendly spirit on the part of every Mississippian awaits manufacturers who wish to come here to work and to live. For full information address the Mississippi Industrial Commission, Jackson, Mississippi.

MISSISSIPPI INDUSTRIAL COMMISSION

A Department of the State of Mississippi
JACKSON, MISSISSIPPI





ANALYSIS

Some States Spend Billions on Economic Tax Incentives for Little or No Return

CITYLAB

Handing Out Tax Breaks to Businesses Is Worse Than Useless

RICHARD FLORIDA | MAR 7, 2017

A new study exposes the futility of the \$45 billion in economic development incentives.

CITY &
STATE
NEW YORK

OPINION

The state budget keeps wasting economic development cash

The programs have failed. It's time to try something new.

By RILEY EDWARDS | APRIL 5, 2018



Motivation

The New York Times

Amazon Plans Second Headquarters, Opening a Bidding War Among Cities



Foxconn got a really good deal from Wisconsin. And it's getting better

Foxconn received \$4.5 billion from Wisconsin and local governments. Foxconn never did more than preliminary ground work.

Source: NPR, <https://www.npr.org/2020/01/14/796344782/wisconsin-foxconn-and-the-lure-of-state-tax-incentives>.



THE

**“MILWAUKEE IS
WHERE WE WILL
TRANSITION OUR AI
8K+5G VISION INTO
REALITY.”** Foxconn executive

FOXCONN IS CONFUSING THE HELL OUT OF WISCONSIN

Last summer, Foxconn announced a barrage of new projects in Wisconsin — so we went looking for them

**HOW DO YOU PROVE THAT FOXCONN WON'T
CREATE A RESEARCH CAMPUS LARGER
THAN MIT IN RURAL WISCONSIN, EXCEPT BY
POINTING OUT IT MAKES NO SENSE?**

THE
NEW YORKER

DID SCOTT
WALKER AND
DONALD TRUMP
DEAL AWAY THE
WISCONSIN

Bloomberg Businessweek
Inside Wisconsin's

Disastrous \$4.5 Billion Deal With Foxconn

A huge tax break was supposed to create a manufacturing paradise, but interviews with 49 people familiar with the project depict a chaotic operation unlikely to ever employ 13,000 workers.

By Austin Carr



Hanoi is ahead of Columbus in this war—illustrating LDCs are able to compete in this industry quite well



Samsung Vietnam plans to expand its investment in Vietnam (Photo: VNA)



Outline

1. News flash!!! Ohio has performed fantastically well at attracting (usually manufacturing) large facilities over the last 40+ years!!! But has this moved the needle?
2. Jobs Ohio and their predecessors have been wildly successful at their stated goal at bringing in large plants/firms.
 - Yet, Ohio's job and population growth linger near the bottom and personal income lags.
 - Jobs Ohio and its predecessors metrics seem to be counting first downs rather touchdowns or the final score for success. Its like if the 3-14 Chicago Bears claimed wild success because they had more first-downs than their opponent even if they lost 42-7.



Outline—cont.

3. Economic Development History repeats – Jump from fad-to-fad. Always searching for “quick fix.” Hoping an outside “knight in armor” saves us even as only 4% of net job growth is from cross-state firm/investment moves.
--Because it's a clear example of fad-based policy where hype trumped evidence, we'll review oil & gas industry's underwhelming economic effects for most Ohio communities.
4. Today, Ohio leads the vast majority of states in use of tax-incentive based policies to attract/retain *large* facilities—with a strong manufacturing bias.
5. US semiconductor industry jobs have declined for decades—fighting to grab a share of a shrinking pie is problematic. Generally, this is a key problem with manufacturing-led economic development—rapid productivity growth continuously reduces employment.



6. Opportunity Costs (OC) of high-tech development include the following (**OCs don't go away when ignored!**):

- Smaller job multipliers, especially when Area lacks an existing supply chain.
- Crowds-out start-ups and small business EVEN within related supply-chain industries.
 - Particularly problematic because small-firms/new firms create a disproportionately large share of new **net** job formation and new innovation.
- Drives up local input prices such as land and construction costs
 - \$30 increase in my monthly condo fees for the new fence. New homes and buildings won't be built due C-bus construction worker shortage. These job losses offset the gains.
 - Greater housing prices reduce area's real wage and attractiveness for all.



Sky-high rural property values squeeze Ohio farmers looking to expand

Patrick Cooley, The Columbus Dispatch Updated 54 days ago

Agriculture

Add +



Land price effects crowds out farmers and other businesses

However, since Intel announced plans to [build a pair of computer chip factories](#) near New Albany, skyrocketing property values in Licking County have pushed that financial stability beyond his reach. [Land](#) that once was worth less than \$10,000 per acre has sold for [more than six figures](#) for the Intel project itself.

“And it will most likely continue to increase in value,” Garrabrant said.

With Intel and central Ohio growth, comes charges of construction worker poaching

Jim Weiker, The Columbus Dispatch 6:02 a.m. EST Jan. 26, 2023

Construction Industry

Add +



Worker supply shortage → will lead to wage increases or other projects for local businesses and residents being delayed & expensive

With Intel starting to [ramp up construction this year](#), along with other major construction projects such as the Honda battery plant in Jeffersonville, the Merchant Building complex next to the North Market, and several planned data centers, demand for workers will be intense. Intel alone forecasts that 7,000 construction workers will be employed building the company's two semi-conductor factories in New Albany before the factories are completed in 2025.

Central Ohio economist Bill Lafayette projects construction employment to grow 4.8% this year in the Columbus area, the biggest jump of all employment sectors. The 2,300 new construction workers Lafayette is predicting accounts for one out of four new jobs expected to be created this year in the Columbus area.

"Construction's going to be a bright spot this year," Lafayette said in a [recent economic forecast for central Ohio](#). "Keep in mind that 7,000 construction workers (at Intel) is about 15% of all construction workers currently in central Ohio and those folks are doing other things."



6. Other incentive opportunity costs....cont.

--Incentive costs are borne by someone—higher taxes or less services

- e.g., *USA Today* 2019 exposé on Tesla's NV giga battery factory attracted by \$1.5 billion in incentives lead to large public service cuts.
- e.g., we found Franklin County gov'ts were by far one of the big Ohio players in TIFs, CRAs, etc. since 2003. Yet, property tax rates rose twice the state average and Franklin County resident income taxes accounted for almost twice their share of household income as the state avg.
- Fewer public services and higher taxes erodes local competitiveness for everyone else.

--Political Economy Costs in that gov't officials cater to Intel & local “elites” and less the broader regional economy—corruption and rent-seeking.

7. Someone pays the opportunity costs of Intel's subsidies: Who? The Tooth Fairy, Santa Claus, or Columbus/Ohio's businesses & residents?

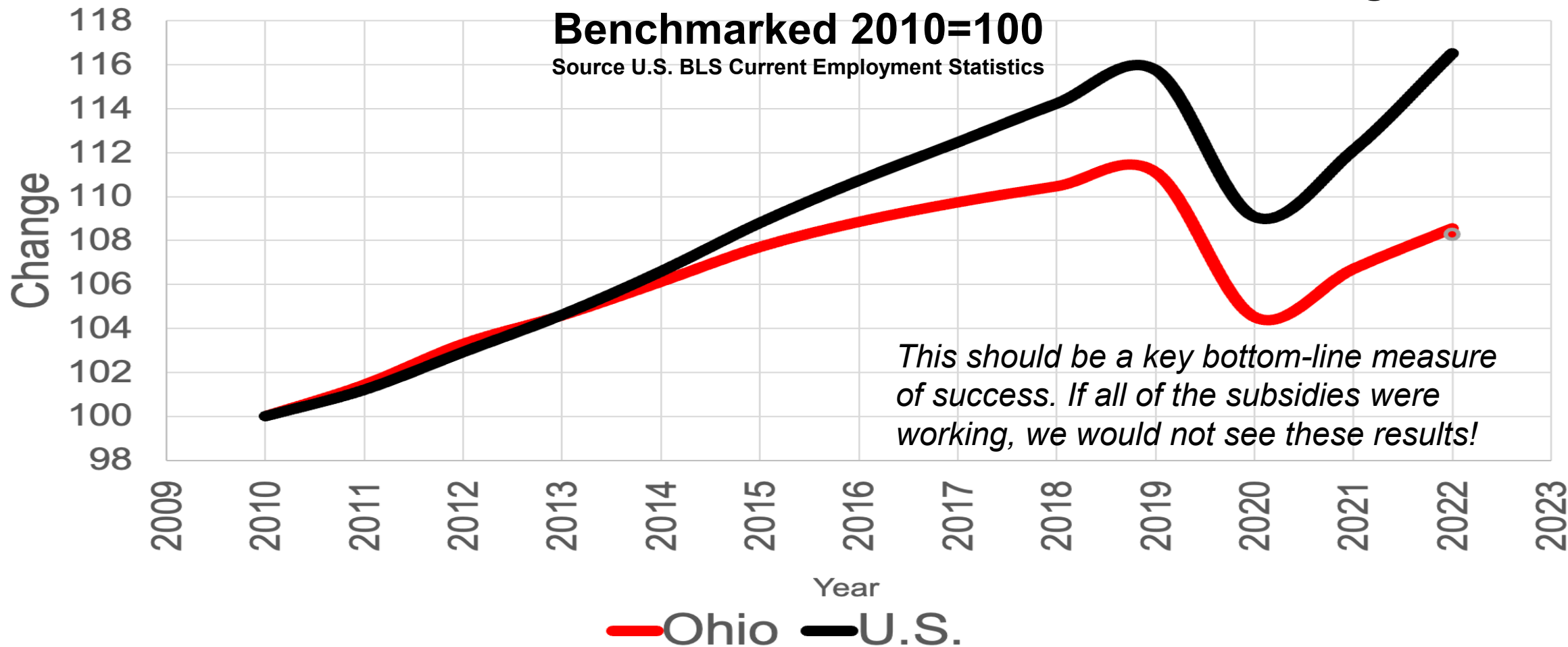


Jobs Ohio Era

2010-2022 Ohio Nonfarm Job Growth Relative to US Average:

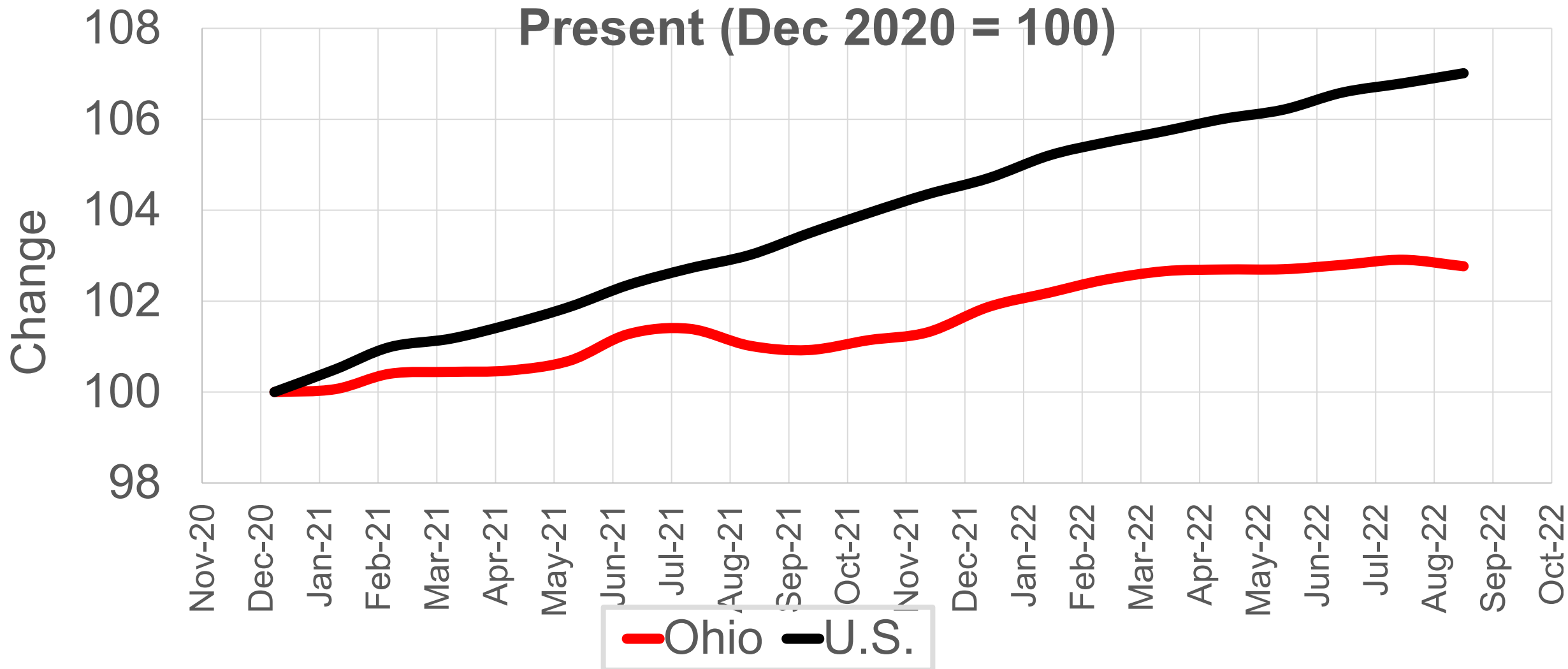
Benchmarked 2010=100

Source U.S. BLS Current Employment Statistics





Monthly Change in Non-Farm Employment, 2021-Present (Dec 2020 = 100)





• What's the Matter with Ohio?

- Landing large facilities & targeting manufacturing as an economic development strategy goes against the actual evidence for fast growing states—job growth and innovation is disproportionately from **new-firm formation** and OH is near the bottom.
- Also, OH's population is disproportionately > 60 yrs. Retention problem for those under 60.
 - E.g., Recent college graduates and entrepreneurs can live anywhere. What do they want? We may not like the answer but ignoring it means they will continue to “vote with their feet.”
- Population retention problem is one “main suspect.” We focus on labor demand, but not on labor supply—i.e., quality of life.
- It is **not** enough to have jobs if key demographic groups seem to not like the place.
- Migration data shows young adults are vastly more geographically mobile than older adults. Moves of young adults are a key driver of where growth occurs.



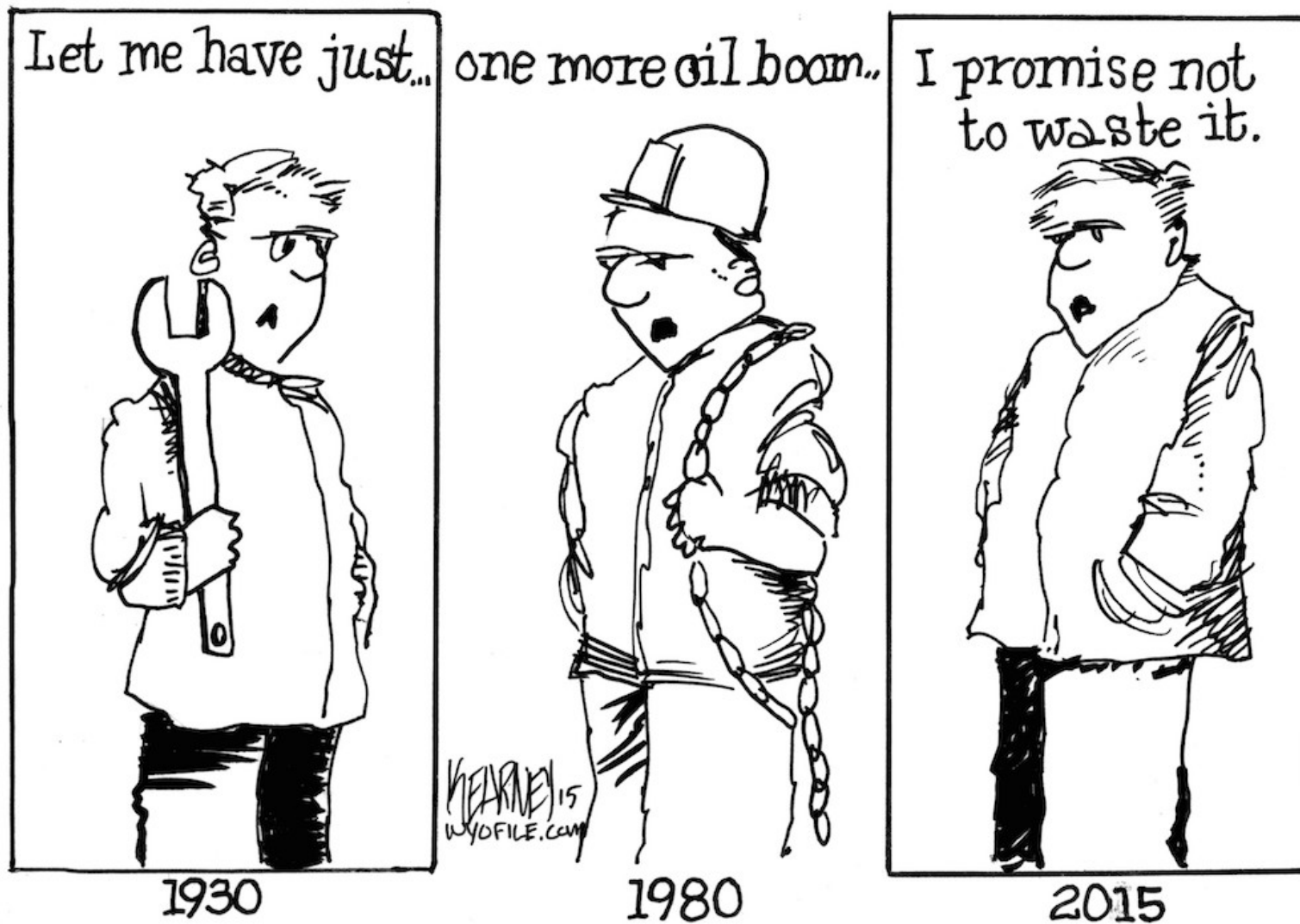
What is the state's success rate using of "gut-hunch," donor based, or fad-based economic development policies?

Let's look at Ohio's oil and gas development to get a feel.

In early 2012, we had a meeting with Jobs Ohio personal, in which they explained why our forecasts of job growth and other benefits from an oil and gas boom were too low in their opinion.

--We were poo-pooed as Ivory Tower folks with no clue about the workings of the "real world." Though our accuracy was 100%

--We responded that just because we apply rigorous scientific statistical methods, decades of experience, and an evidence basis, doesn't **at all** imply we are wrong.

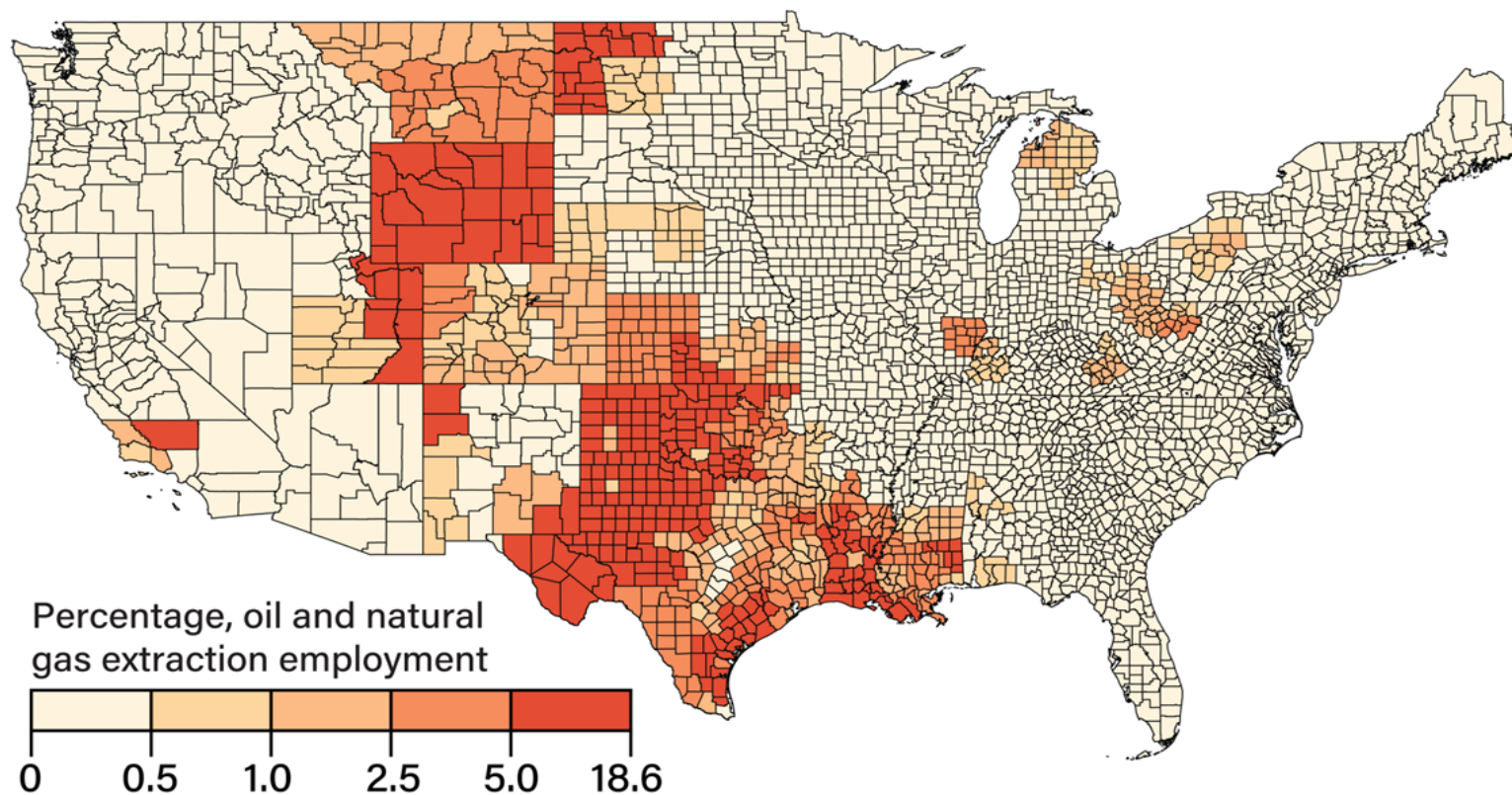




Share of county employment in oil and natural gas extraction, 1980



Economic Research Service
U.S. DEPARTMENT OF AGRICULTURE



Notes: Counties with greater than 2.5 percent of total employment from oil and natural gas extraction are classified as "boom counties." Research for this map focused only on the contiguous United States.

Source: USDA, Economic Research Service using data from the 1980 U.S. Census, Integrated Public Use Microdata Sample.



In 2011 and 2012, we heard a lot about oil and gas....

“Kleinhenz & Associates (2011) (oil & gas industry-funded) estimate that the natural gas industry would create and support over 200,000 jobs to Ohio and \$14 billion in spending in the next four years.”-Partridge and Weinstein, 2011.

Commenting on shale-energy development: “This will be the biggest thing in the state of Ohio since the plow...This is truly extraordinary.” Aubrey McClendon CEO of Chesapeake Energy of Oklahoma. Quoted in the *Columbus Dispatch* “Realism on Renewable Energy.” September 22, 2011, Pp. B1-B2.

“David Mustine, a former oil company executive and chief of the Ohio Department of Natural Resources, changed jobs to work for the new JobsOhio economic development office as general manager for energy. Mark Kvamme, JobsOhio chief investment officer, said “oil and gas in Eastern Ohio has the **potential to permanently transform that end of the state** and position Ohio overall for a **renaissance in manufacturing** that depends on the low-cost, reliable energy that shale can provide.” – *Shale Insight*, 2011

“Ohio this year has 39,000 jobs linked to shale oil and gas production, **a number that is projected to more than triple by the end of the decade**, according to a new report...The report was financed by business groups that support shale drilling, including the American Petroleum Institute and America’s Natural Gas Alliance.” - Columbus Dispatch, 2012

“Nearly **66,000 Ohioans** will be involved in shale oil and gas production and related jobs in two years, with the industry pumping billions into the economy as a result” – The Ohio Shale Coalition, 2012



Partridge and Weinstein (2011) said 20,000 jobs was the maximum number of jobs Ohio could expect by 2015 from an “oil and gas boom” (which PW said was probably overestimated) vs. the 200,000+ by the industry’s study.

P&W were criticized by the industry as being “biased” and not understanding the complex oil & gas industry—including by Jobs Ohio.

But when 2015 came, it was apparent that PW were accurate...



*"First of all, John [Kasich] got lucky with a thing called fracking, OK? He hit oil. He got lucky with fracking. **Believe me, that is why Ohio is doing well.**" - Donald Trump, 2015*

"In the state of Ohio, we have grown 347,000 jobs. Our unemployment is half of what it was. **Our fracking industry, energy industry may have contributed 20,000**, but if Mr. Trump understood that the real jobs come in the downstream, not in the upstream, but in the downstream. And that's where we're going to get our jobs. But Ohio is diversified."

– John Kasich, November 10, 2015

Tim Keen, Kasich's budget director, added that Ohio has seen job growth in a number of other sectors, including manufacturing, the service industry, and professional and business services.

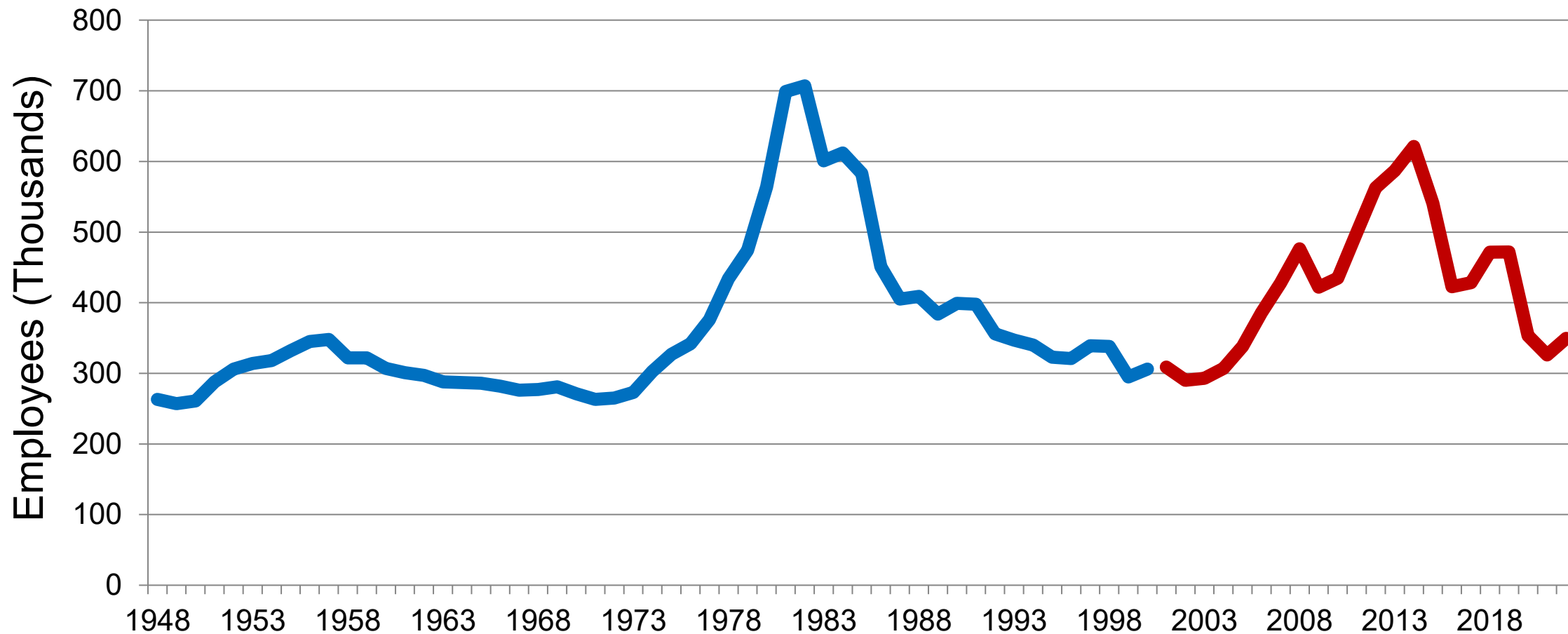
Keen also said it was "patently ridiculous" to claim that Ohio has a \$2 billion budget surplus because Kasich "got lucky" and "hit oil." – Cleveland.com, October 29, 2015

Gov. John Kasich voiced "deep concern" Wednesday that **oil and gas companies were hiring out-of-state workers** for jobs in the state's emerging production fields that should be going to Ohioans.

"We are currently looking at the possibility that these energy companies that have come into Ohio to extract our very valuable assets may not be hiring Ohioans," the governor said. "That is a very serious matter." – Times-Gazette, December 6, 2012



Oil and Gas Extraction - US Employment (1948-2022)

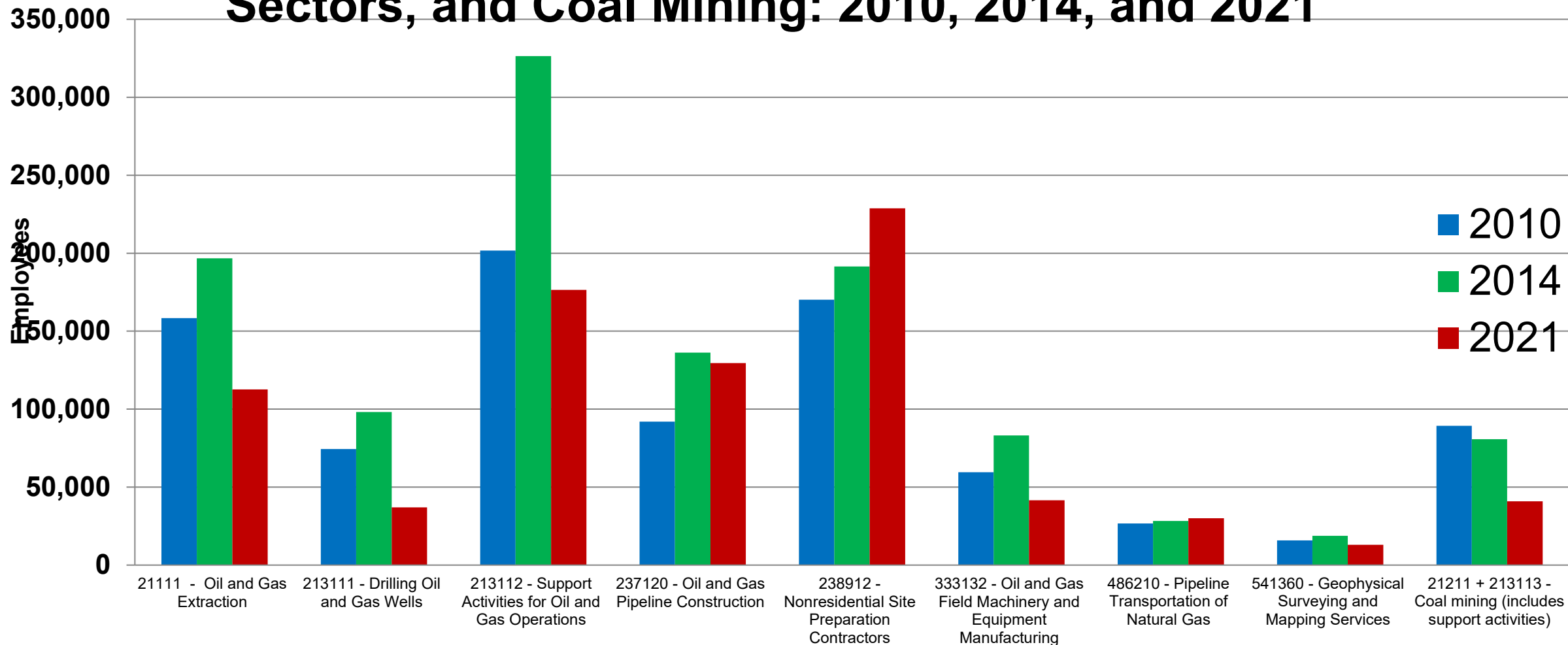


Sources: 1. Bureau of Economic Analysis - National Income and Product Accounts Tables 6.4A-D
2. Bureau of Labor Statistics Quarterly Census of Employment and Wages (includes support activities)
2022 annual jobs reflect only Jan-June average

Oil and gas extraction and support industry (BEA)
Oil and gas extraction & support industry (BLS)

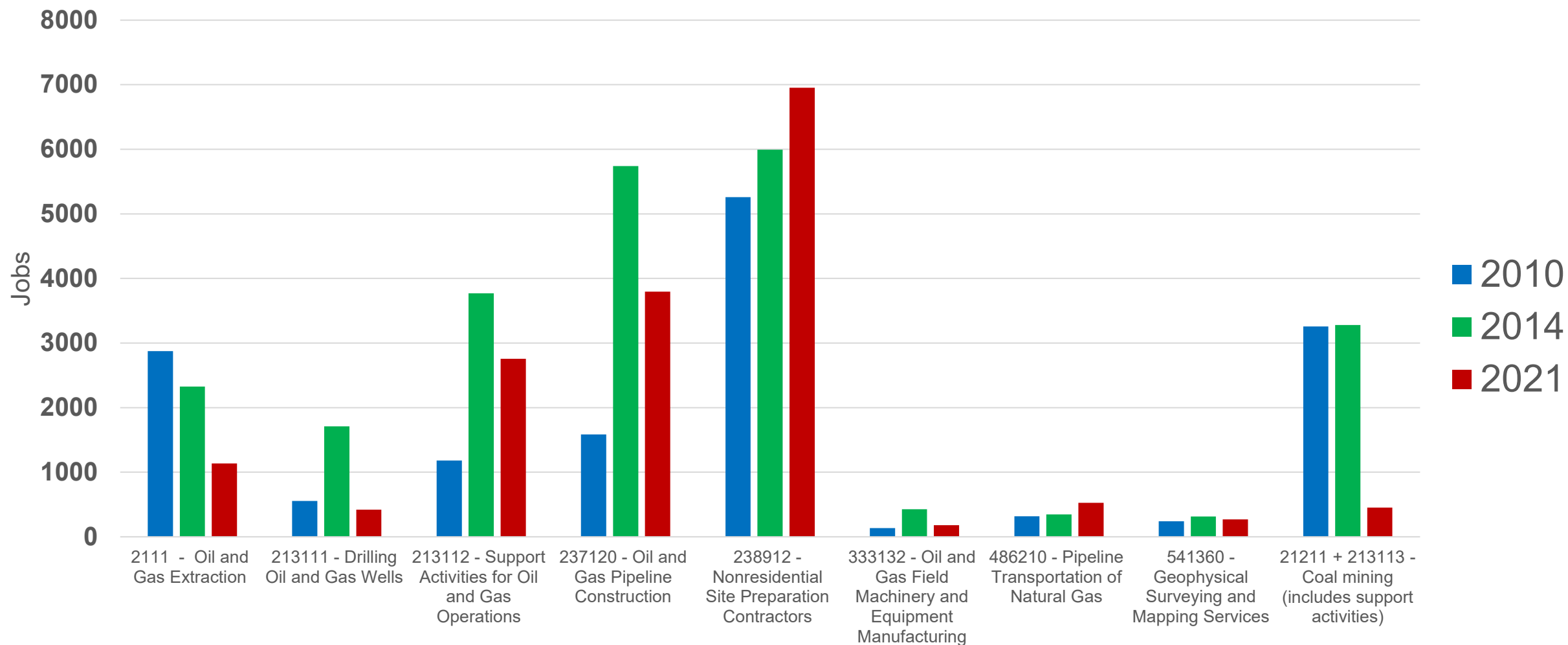


U.S. Employment in Direct and Key Indirect Oil, Gas Sectors, and Coal Mining: 2010, 2014, and 2021



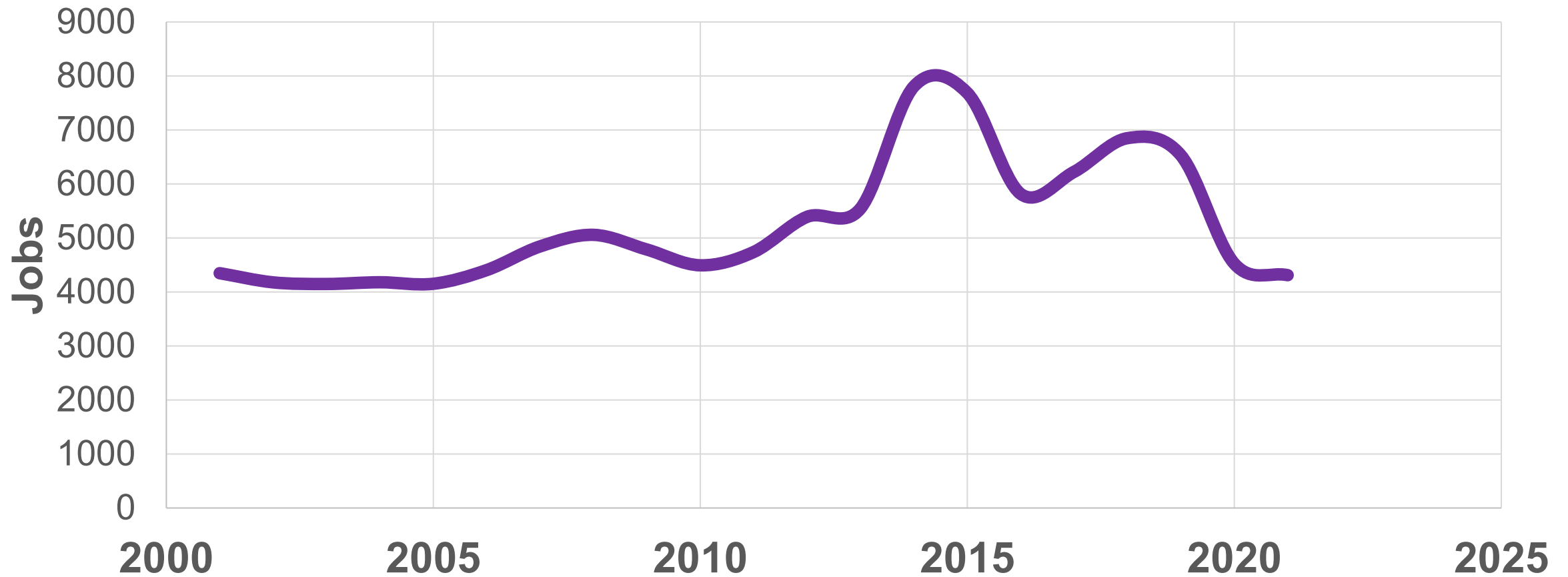


Ohio Employment in Direct and Key Indirect Oil, Gas Sectors, and Coal Mining: 2010, 2014, and 2021





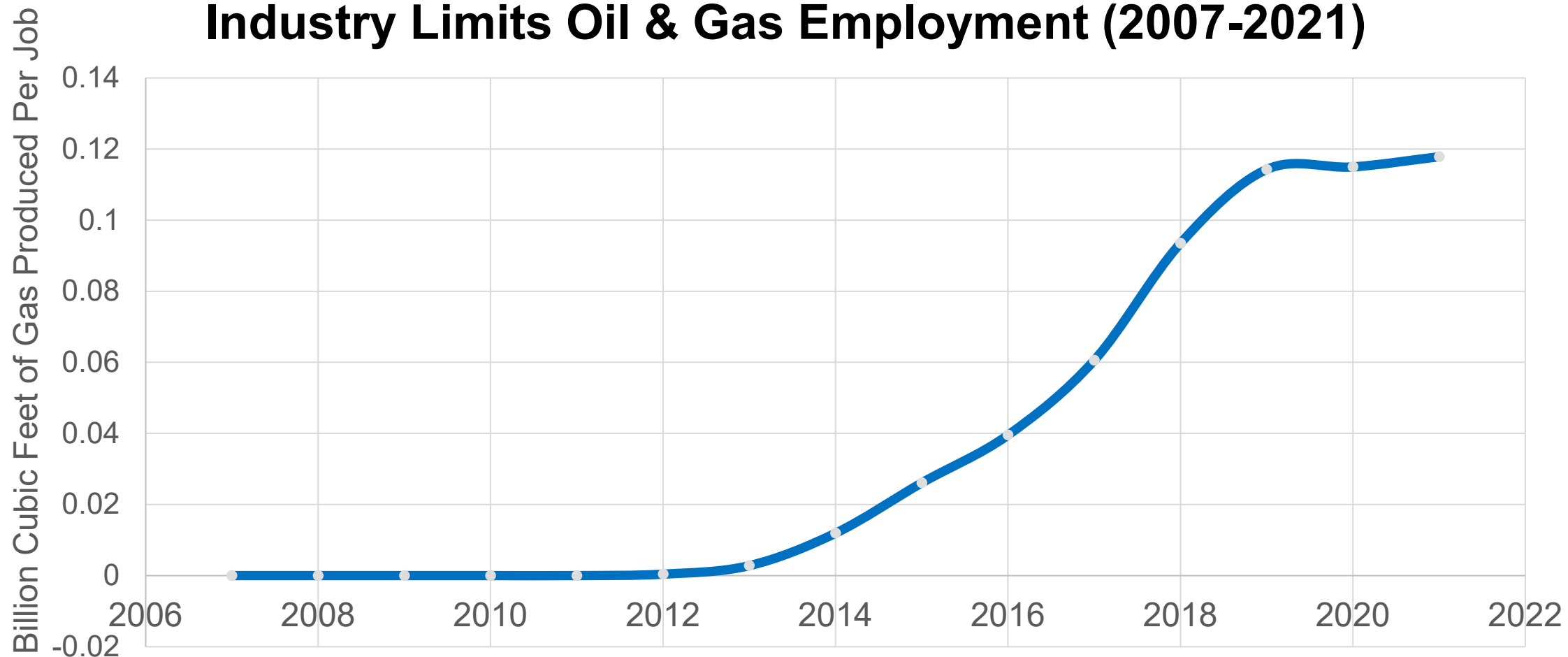
Ohio Oil and Gas Extraction and Support Industry Jobs (2001 - 2021)



Source: Bureau of Labor Statistics Quarterly Census of Employment and Wages (includes support activities) – NAICS 21111, 213111, 213112



Rising Productivity per Worker of Ohio's Natural Gas Industry Limits Oil & Gas Employment (2007-2021)





What's the Matter with Ohio?—(sorry Thomas Frank)

--2022 was an orgy of Ohio tax incentives. [New York is another subsidy star.]

--Adding all state and local tax subsidies, it's about \$7+ billion for Intel, or \$2.5 million per direct job. [assumes all 30 years of tax abatements for Intel by New Albany and does not count supplier subsidies. Probably understates New Albany property tax abatement.]

--\$200+ million for a Ford plant in Loraine County that Ford already promised the UAW they were going to build or replace.



What is Ohio Doing?

It is successfully attracting large facilities—typically with large tax incentives/subsidies. Ohio's policy dates back to at least the 1977 under Governor John Rhodes when he “landed” Honda's motorcycle assembly plant in central Ohio.

FROM MARCH 2004

"With three Site Selection Governor's Cup trophies on display in Columbus, Ohio is seeking to replicate its halcyon days of 1993-1995."

GOVERNOR'S CUP

Buckeye State Comeback



March 1998: Gov Voinovich lower left

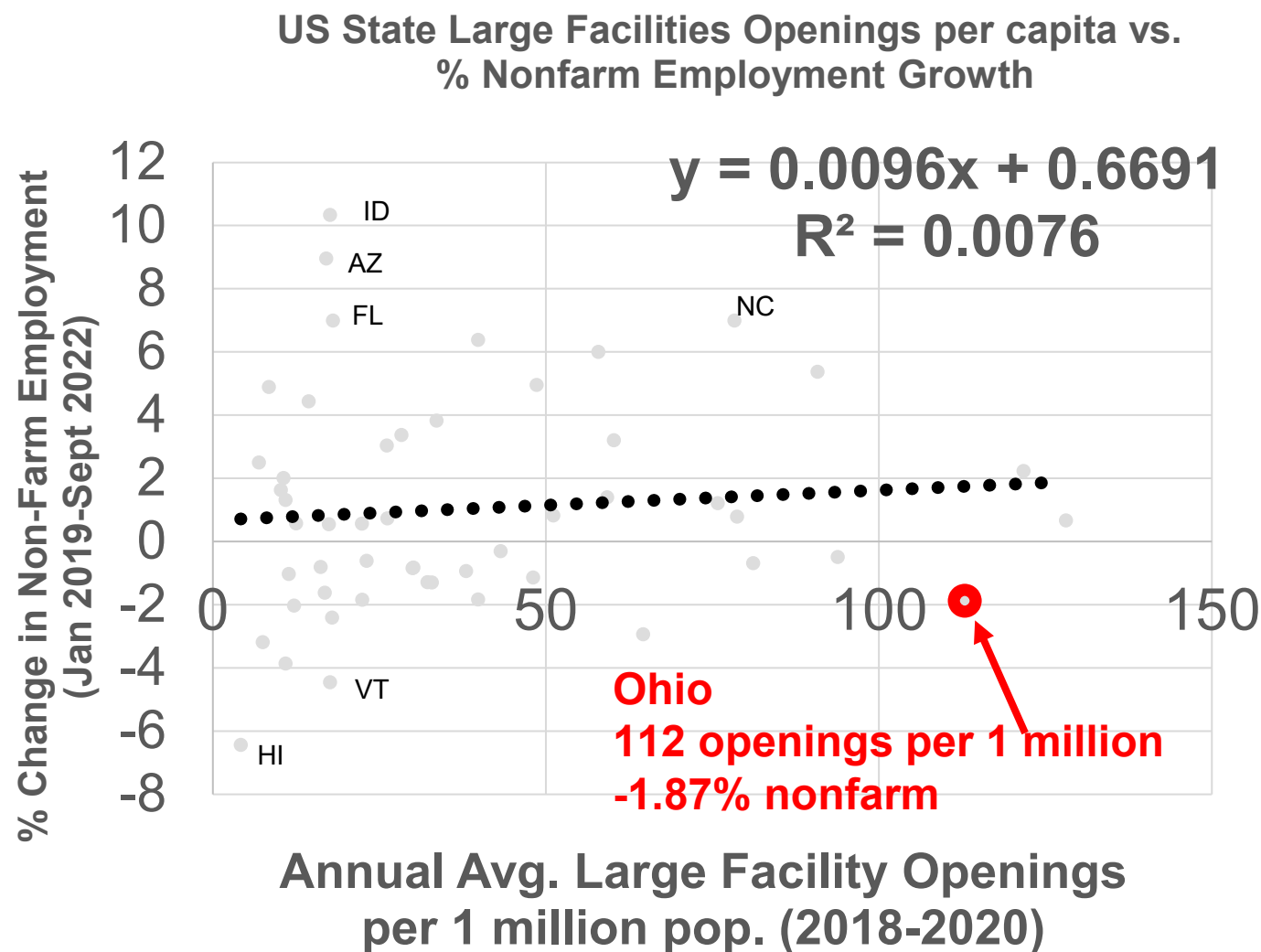


MARCH 2021





- Ohio's bipartisan leaders pushed "business-friendly" tax cuts & regulatory policies after (ca) 1991. Tax-cuts accelerated after 2005.
- And Ohio led in "picking winners" with tax incentives! 8 out of the last 20 years, Ohio has been #1 in attracting (typically incentivized) large facilities (per-capita) (*Site Selection Magazine*). OH was never lower than #4. And ditto for the 1990s. **Regarding stated policy goals, it was wildly successful!!!**
- But, Ohio has persistently low economic growth. Ugh, it looks like something attributed to Einstein regarding doing something over and over again with subsidies & insanity.
- Winning the SSM Governor's Cup is not focusing on the real game—it's like counting first downs rather than touchdowns or the score.



Data sources: Site Selection Magazine & BLS

*Large plant openings have either a minimum investment of \$1 million, at least 20 new jobs, or at least 20,000 sq. feet.

Ohio is historically really good at attracting large facilities w/o any corresponding faster growth

Ohio's rank nationally in Site Selection Magazine big facility openings:

1993 - #1	2008 -- #1
1994 - #1	2009 -- #1
1995 - #1	2010 -- #2
1996 - #2	2011 -- #1
1997 - #2	2012 -- #2
1998 - #3	2013-- #2
1999 - #3	2014 -- #3
2000 - #3	2015 -- #3
2001 - #5*	2016 -- #3
2002 - #4	2017 -- #3
2003 - #1	2018 -- #3
2004 - #3	2019 -- #1
2005 - #2	2020 -- #1
2006 - #1	2021 -- #4
2007 - #1	
2008 - #1	

Ohio finished #1 in 12 out of 29 years!!

*Site Selection Magazine used a radically different process in 2001. Using total new and expanded facilities to be consistent across time, Ohio ranked #5.



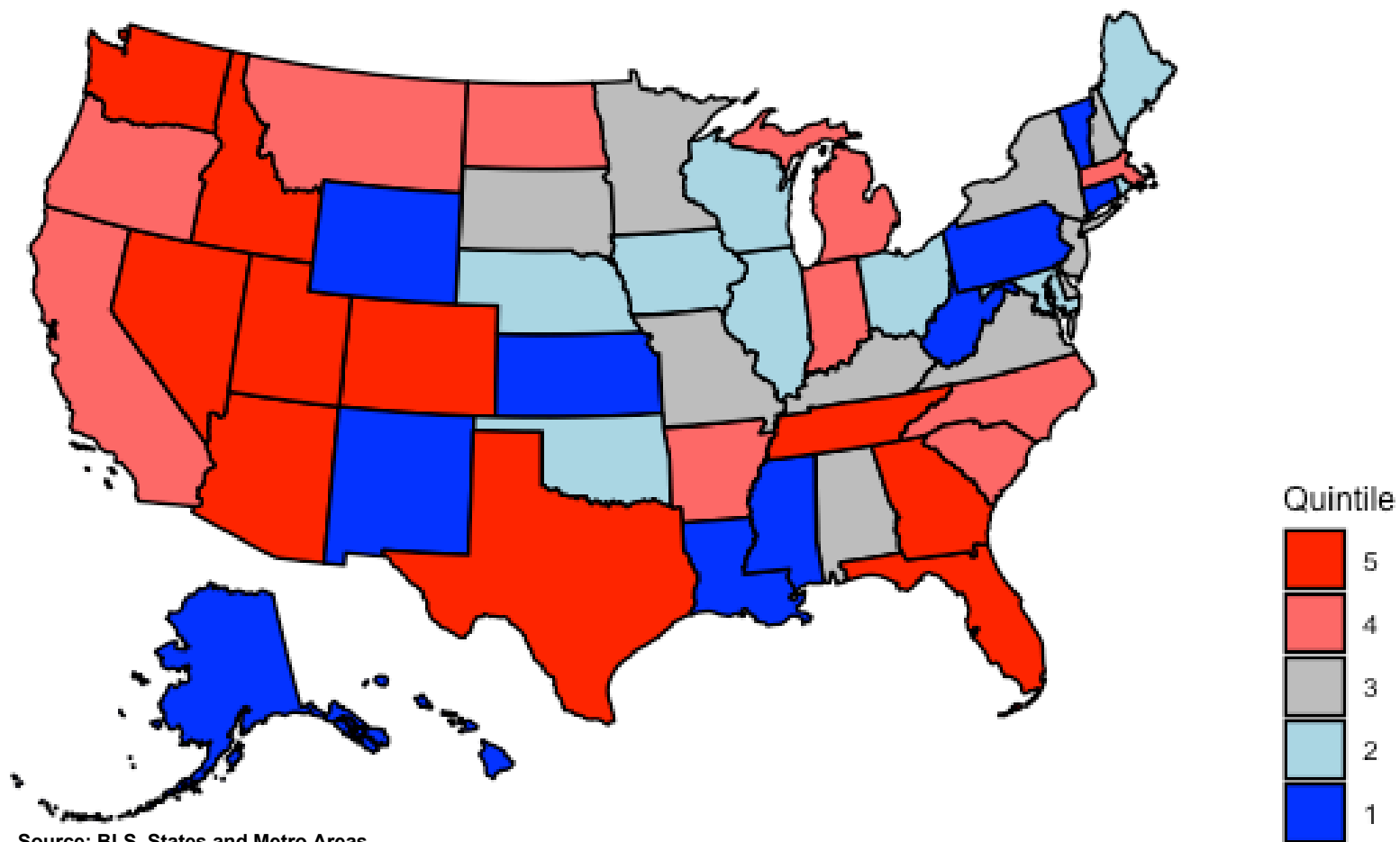
United States

% Change in Non-Farm Employment 2010-2022

2010 - Oct. 2022

Ohio Rank = 32 out of 51

Pre-revision 31



Source: BLS, States and Metro Areas



Intel to Invest at Least \$20 Billion in New Chip Factories in Ohio

'Silicon heartland'

Building up U.S. chip production has been a focus of lawmakers and companies alike amid a global shortage of the crucial components

Ohio Promised \$2.1 Billion in Incentives to Lure Chipmaker Intel

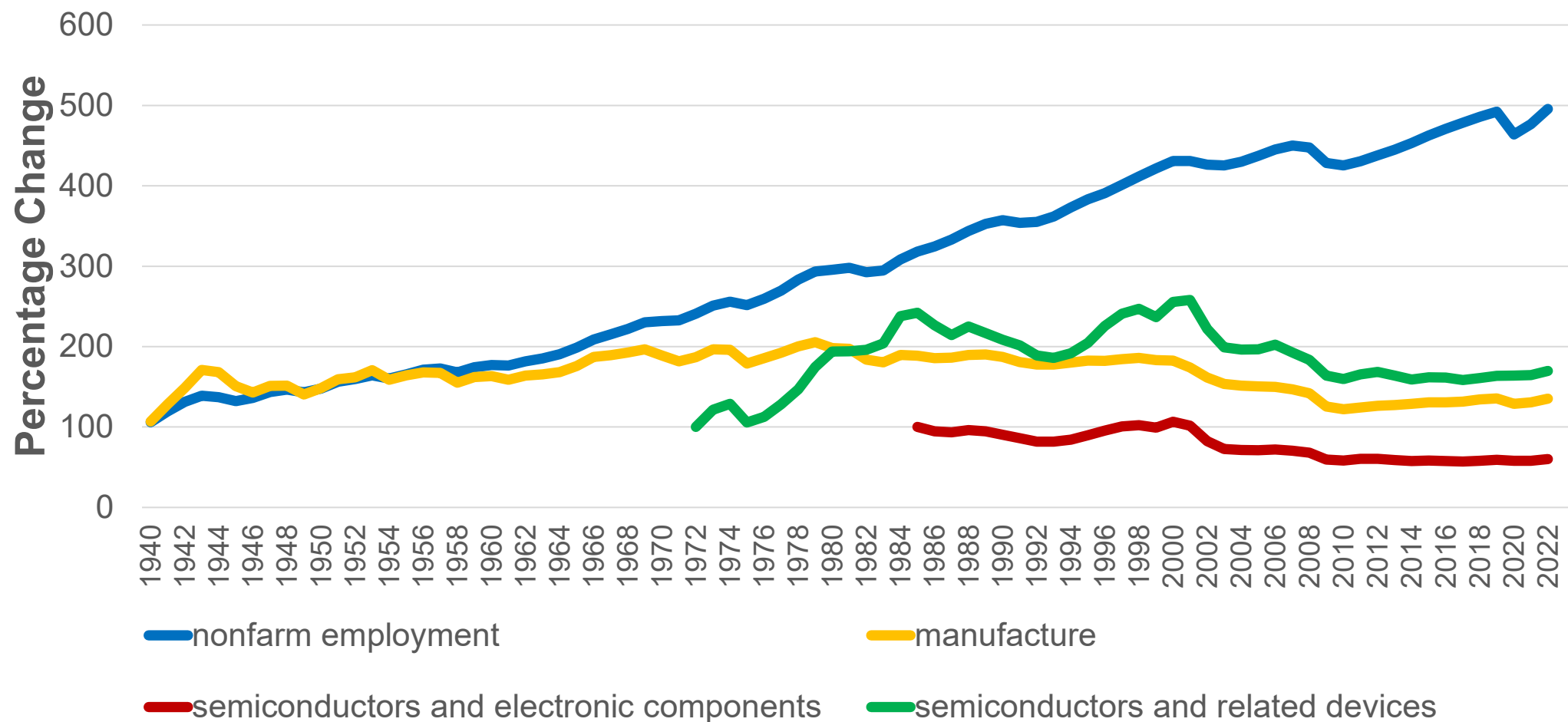
- Intel chose Ohio site for its new \$20 billion chip-making hub
- Subsidy package exceeds what Samsung, Amazon received

Slowly, more dribbles out.

- **Ohio offered another \approx \$1 billion in tax breaks**
- **Local community appears to have also offered Intel about \$1 billion in property tax breaks**
- **Total \approx \$4 billion in state and local subsidies not counting expected federal subsidies & tax credits**





USA Growth in Manufacturing and Semiconductor Manufacturing 1940 - 2020 (1st Year benchmark = 100)







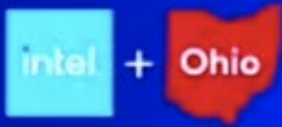
Why we're offering it

 **Bolsters America's national security.**

 **Creates the infrastructure for semiconductor manufacturing that other companies can leverage.**

 **Establishes Ohio as the world center for modern manufacturing.**

 **Makes an additional \$2.8 billion annual contribution to Ohio gross state product.**





Red herring arguments!

“Commerce Gina Raimondo, Intel CEO Pat Gelsinger, and other executives and local officials suggested the up-to-\$100 billion development could be a panacea for a wide variety of issues, too — including global competitiveness, national security, the chip shortage, the high price of cars, racial and gender gaps in STEM employment, even inflation itself.” — *What we know about Intel’s \$20 billion bet on Ohio, The Verge*

<https://www.theverge.com/2022/1/22/22895447/intel-ohio-chip-fab-manufacturing-cpu-processor-explained>



National Security –

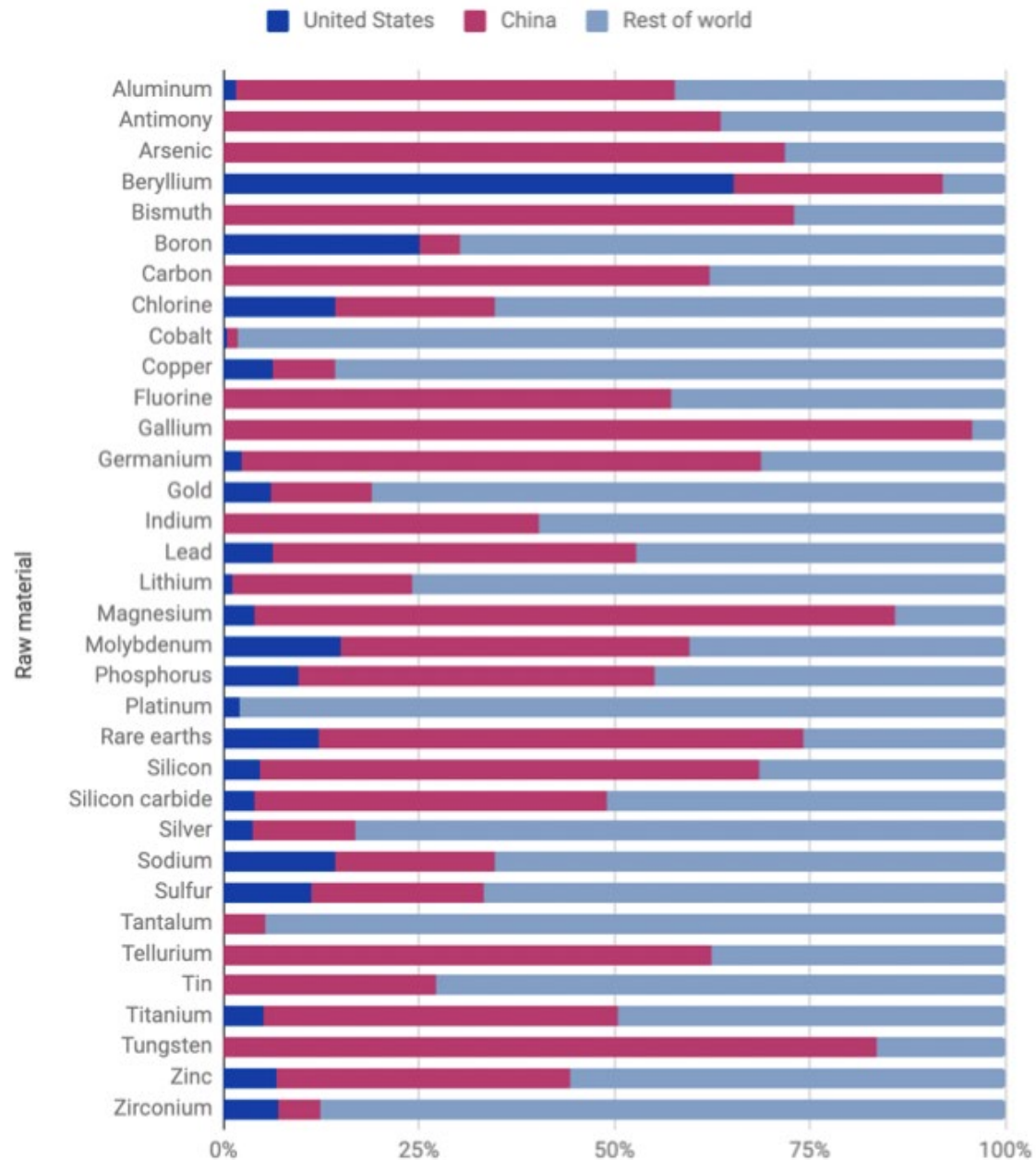
- Why are Ohio taxpayers subsidizing national security for 49+ other states?
- Even if Columbus residents see a positive ROI on their “investment” in Intel (added taxes and/or declining public services and congestion effects), the state incentives draw from state revenue.
- Why are residents who buy alcohol in Toledo, for example, subsidizing national security for 49 other states with no ROI?
- Why invest in the most prosperous area in Ohio?



“To combat the rise of China” & “secure domestic supply chain”

- Chip manufacturing requires raw materials – rare earth elements (REE) and other strategic supplies.
- "Of the plethora of minerals / rare earth metals and chemicals required, many are not readily available within the United States. The U.S. Geological Survey (USGS) tracks 35 minerals that are critical to the aerospace, defense, energy, telecommunications, and transportation sectors.
- Of these 35 minerals, 30 are relevant to semiconductor manufacturing. **23 have an import reliance greater than 75%, and 12 have an import reliance of 100%.** In addition to minerals, semiconductor manufacturing relies on a large, complex combination of chemicals, which must be highly purified.
- “A single semiconductor facility may use approximately 430 different chemicals in its fabrication processes.”

Source: (p. 4 USRESPONSE TO REQUEST FOR COMMENT: Risks in the Semiconductor Manufacturing and Advanced Packaging Supply Chain (BIS-2021-0011))]



Source: The Semiconductor Supply Chain: Assessing National Competitiveness, CSET 2021 – Data from USGS



“It is important to note **semiconductors are not all created equal**... End products like cars can require several different, specific semiconductor nodes.”

“RFI respondents are most **concentrated on a few specific kinds of semiconductor inputs and applications**, including legacy logic chips...analog chips... and optoelectronic chips.”

“That means it’s helpful to think about semiconductors **not as one product with one universal supply chain**, but as a collection of many different products, each with their own supply chain that can have a more or less severe supply and demand mismatch. In addition, **different end products have different constraints** (e.g., constraints on chip design, longer product life cycles).

“Despite the progress made since early 2021, the semiconductor shortage persists. That’s due in part to **the complexity of the semiconductor supply chain** (see Figure 3). **Producers don’t always have a clear sense of demand**, and chip consumers don’t always know where the chips they need originate. These barriers make it harder to develop solutions.”



Will Intel help solve today's chip shortage, car prices, and inflation?

“It can’t. While the chip shortage is a gigantic supply chain issue that is absolutely affecting the auto industry, leading chipmakers agree it’s slated to ease in the second half of 2022, and this plant won’t be operating until 2025 at the earliest. “Given this fab goes online in 2025 it won’t have any impact on the current chip crisis,” says Moor Insights & Strategy analyst Pat Moorhead.

Also, Intel doesn’t produce chips for cars, at least not yet. Intel had nothing to do with the shortage of car chips. (Intel did buy autonomous driving chip company Mobileye in 2017, but its chips are produced by TSMC.) ???

None of that stopped US Secretary of Commerce Gina Raimondo, President Joe Biden, and Ohio Governor Mike DeWine from repeatedly bringing up cars and tying them to inflation, though. “Car prices are driving a third of inflation because we don’t have enough chips,” said Raimondo, adding that each electric vehicle requires 2,000 chips. “So that’s why today’s announcement from Intel is so exciting.”



Like a new Browns QB, “Silicon Heartland” is another name on the long list of locations dubbed “the next Silicon _____”

THE NEXT SILICON VALLEY WHERE WILL IT BE? DEC. 19 2013 12:37 PM

SLATE



A World Map of All the “Next Silicon Valleys”

Want a startup scene in your hometown? First, think of a catchy nickname.



By Chris Kirk and Will Oremus

Not every city in the world can be the next Silicon Valley—but that won’t stop them from trying. Earlier this month, *Slate*’s David Auerbach explained how four crucial ingredients **gave rise to the original Silicon Valley**: easy research money, easy startup money, mobility, and patience. Oddly, “a catchy nickname” did not make the cut, although it seems to be the first thing on any would-be tech hub’s agenda these days. There’s Silicon Alley, Silicon Hills, Silicon Forest, Silicon Prairie, Silicon Square, Silicon Wadi, and even the Silicon Savannah. Santiago is Chilecon Valley, Philadelphia is Philicon Valley, and Chattanooga is—breaking the nomenclative mold—Gig City. The list **goes on**.





 The next Silicon Valley? Tech Nation to close after UK ... - CNBC

TECH

UK pulls plug on top tech incubator after setting out to become 'world's next Silicon Valley'

PUBLISHED TUE, JAN 31 2023 9:40 AM EST UPDATED TUE, JAN 31 2023 11:05 AM EST



Ryan Browne
@RYAN_BROWNE_

WATCH LIVE

The government put the contract out to tender last year after raising concerns that Tech Nation was in breach of state aid rules after failing to become “self-sufficient,” The Sunday Times [reported](#).

Tech Nation says the DCMS grant accounted for roughly 62% of its funding in 2021/22. The remainder of its income came from sponsorship, commercial partnerships and other government contracts.

As a result of the move, Tech Nation said its current activities were “not viable on a standalone basis” and would therefore need to be wound up.

<https://www.cnbc.com/2023/01/31/the-next-silicon-valley-tech-nation-to-close-after-uk-pulls-funding.html>



Traffic passes around the Old Street roundabout, also referred to as “Silicon Roundabout,” in the area known as “Tech City” in London, U.K.

Chris Ratcliffe | Bloomberg | Getty Images

The next Silicon Valley?

The move has raised questions over the U.K.’s ambitions to rev up its digital leadership on the global stage following its exit from the European Union. Just days ago, Finance Minister Jeremy Hunt had talked up the U.K.’s chances of becoming the “[world’s next Silicon Valley](#).”



Even if these security and economic arguments were valid... Intel's Ohio's investment, for which it is being heavily subsidized, is a drop in the bucket and it is unlikely to catch other chip manufacturers... will it remain competitive?

“Every little bit helps, I imagine, but even if the House approved \$52 billion in funding for domestic semiconductor manufacturing and Intel spent the full \$100 billion in Ohio — again, over a decade — they'll still be completely dwarfed by chip giants TSMC and Samsung.

Samsung invests \$25 billion each year on chipmaking at its new Pyeongtaek chipmaking hub... a larger hub than Intel's. It is also planning a \$17 billion facility in Taylor, TX. “Samsung announced 38 trillion won in new investments, including a new wing at its Pyeongtaek facility, when Moon unveiled his plans for the semiconductor industry. About a week later, it announced it would spend \$17 billion to build a new American factory at an event in Washington, shortly before Moon met with U.S. President Joe Biden.” — Nikkei Asia, June 2021, <https://asia.nikkei.com/Business/Tech/Semiconductors/Samsung-turns-South-Korea-garrison-city-into-chipmaking-boom-town>

Taiwan Semiconductor Manufacturing Company (TSMC) spent \$41 billion last year... up from \$30 billion in 2021.



“Intel trails both of them in technology prowess, forcing the California company into the ironic position of relying on TSMC to produce its best chips. Gelsinger is confident that he can catch up. Maybe he will, but there’s no way the firm will be able to expand capacity and economies of scale to the point of being financially competitive. Put another way, Intel will need to sacrifice margins to gain the volume needed to fill the fabs he too wants to build.” – Tim Culpan, Bloomberg Business 2022

<https://www.theverge.com/2022/1/13/22881576/tsmc-capital-investment-2022-chip-manufacturer-demand-increase>



Economic Development Best Practices

Think small to think BIG – focus on ***small businesses!***

What can you do to help Ohioans start businesses?

It's easier to grow existing small businesses than attract new businesses

Help *ALL* Ohio businesses rather than picking only a few large companies or one industry

Help increase workforce skills

Promote community investments that help attract and retain a skilled workforce – quality of life!



“Mayors are shifting their focus from attracting firms to attracting residents by improving *quality of life*”

The Economist, 9/9/21





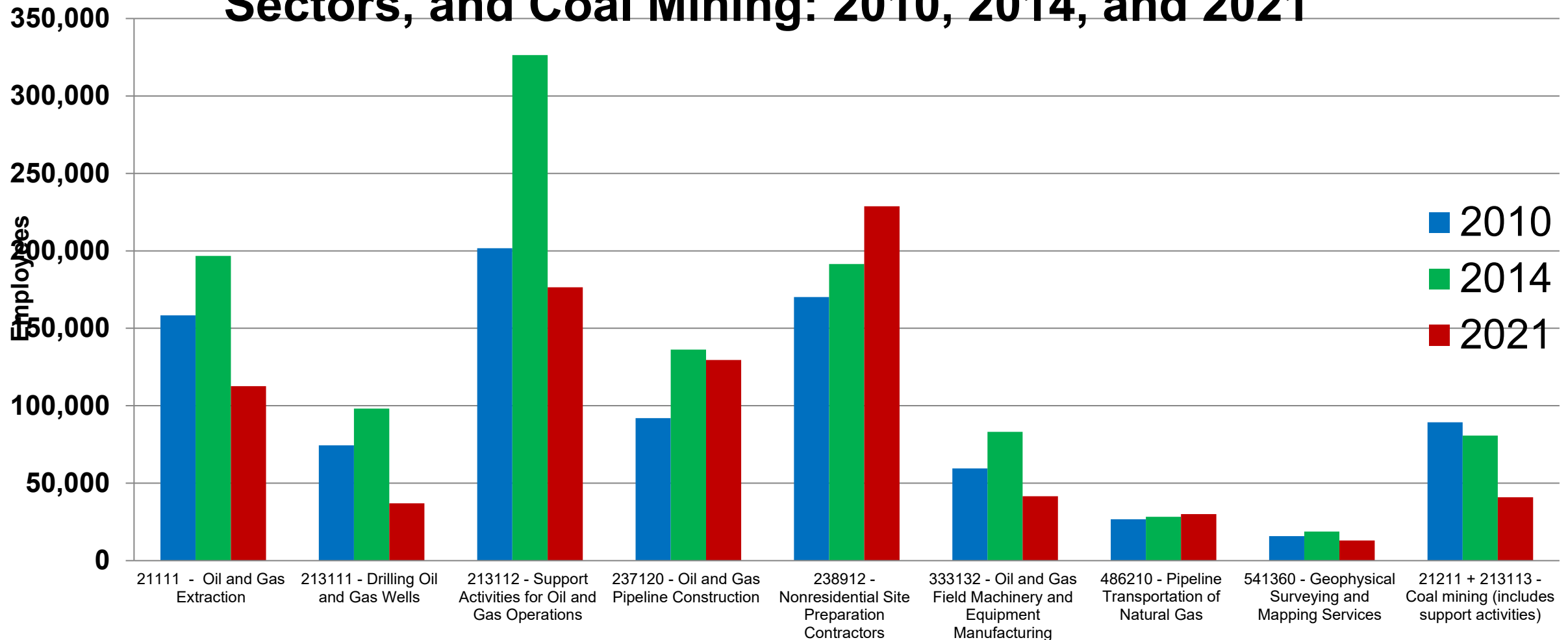
Thank You!



Appendix

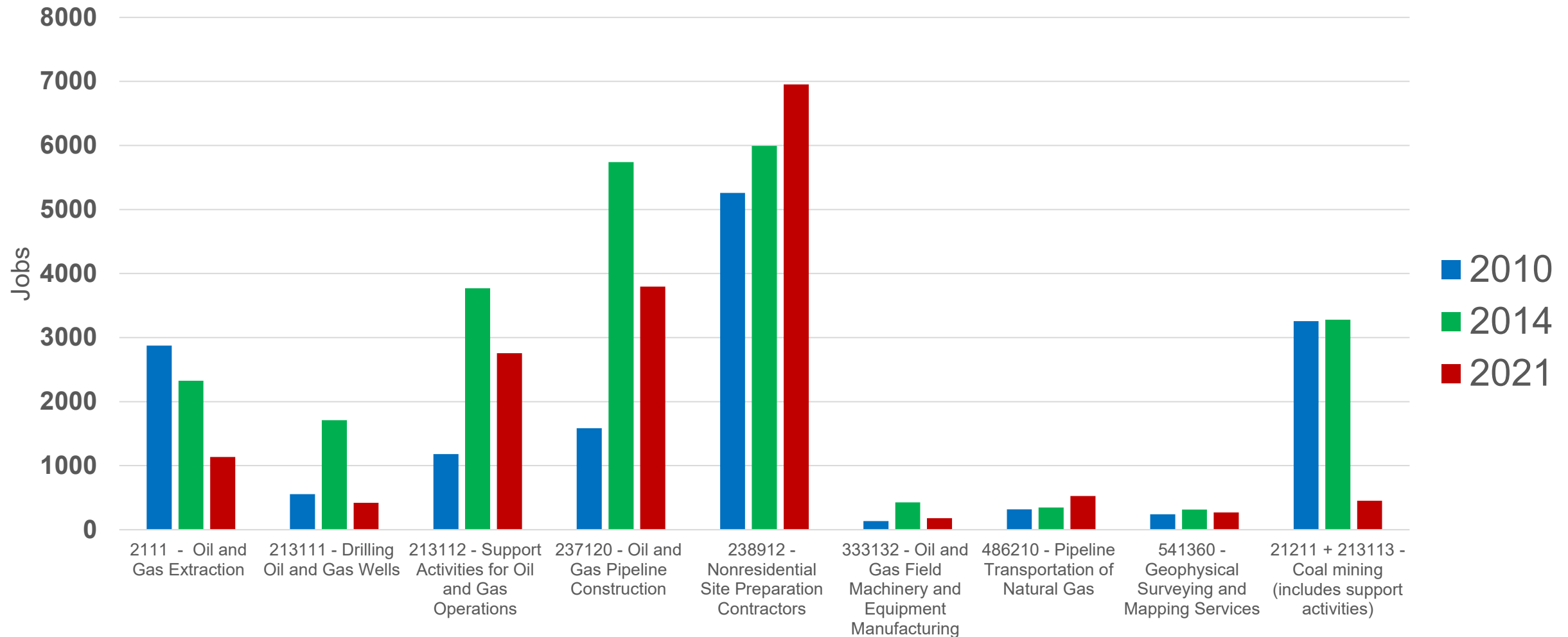


U.S. Employment in Direct and Key Indirect Oil, Gas Sectors, and Coal Mining: 2010, 2014, and 2021





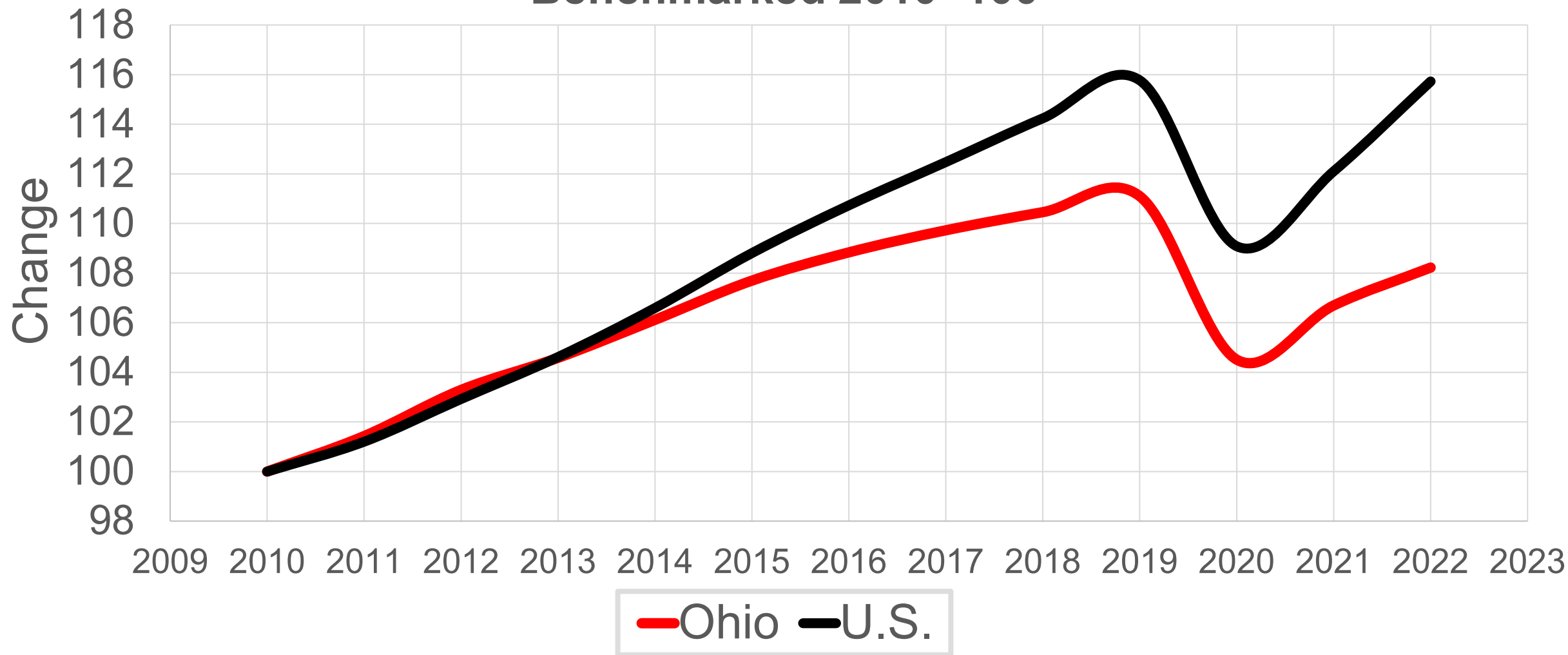
Ohio Employment in Direct and Key Indirect Oil, Gas Sectors, and Coal Mining: 2010, 2014, and 2021





JobsOhio Era

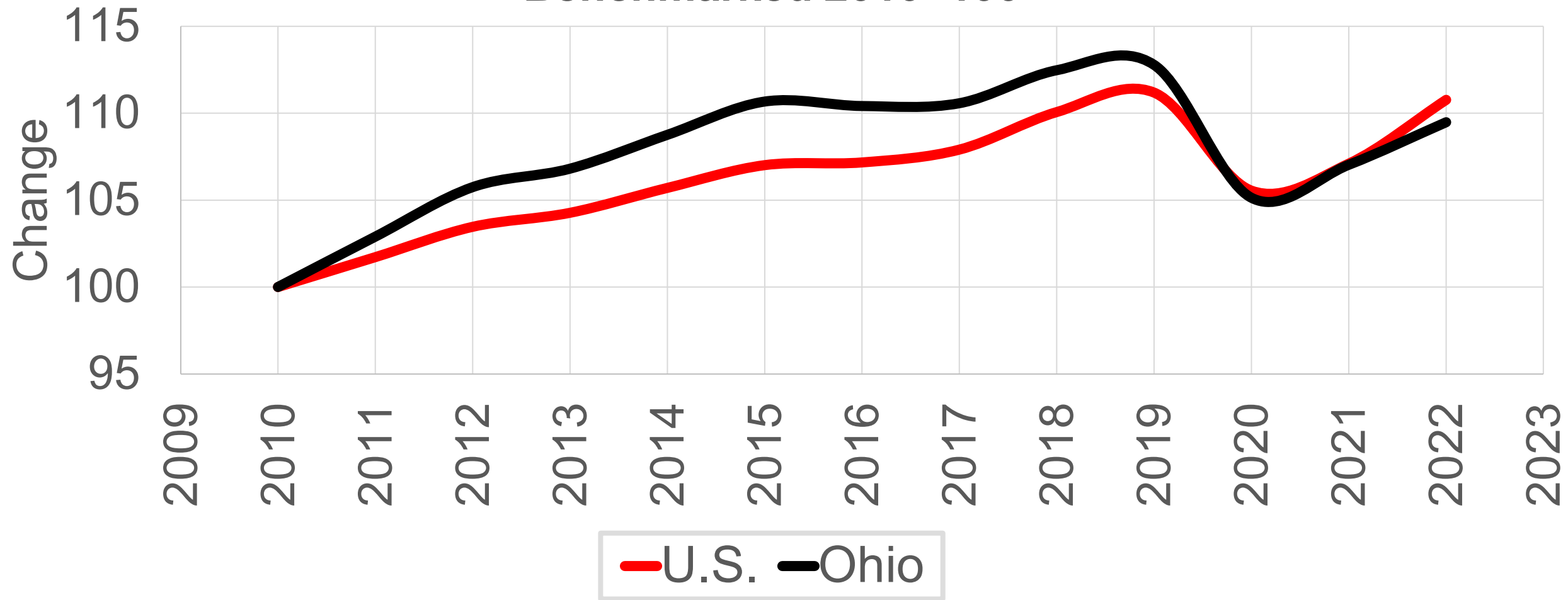
2010—2022 Nonfarm Job Growth Relative to US Average Benchmarked 2010=100





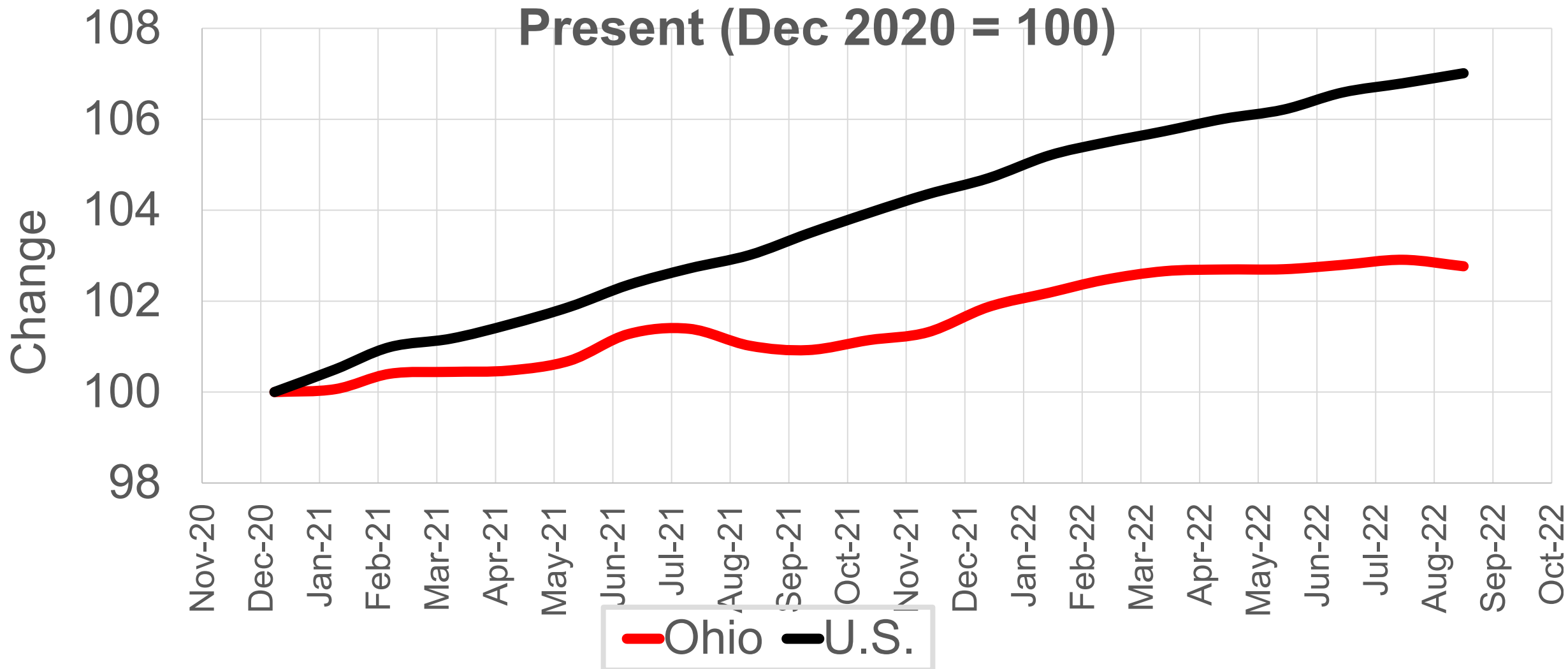
JobsOhio Era

2010—2022 Manufacturing Job Growth Relative to US Average
Benchmarked 2010=100





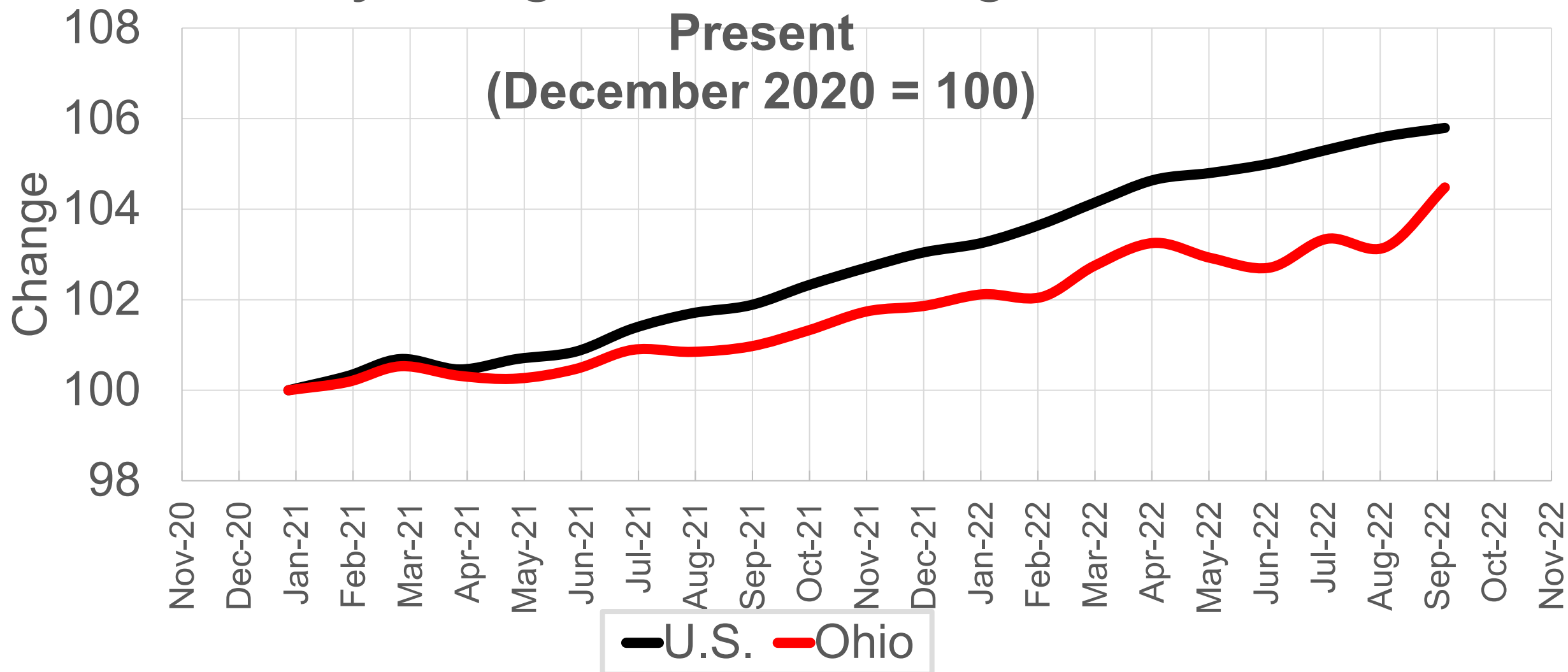
Monthly Change in Non-Farm Employment, 2021-Present (Dec 2020 = 100)





Monthly Change in Manufacturing Jobs, 2021 – Present

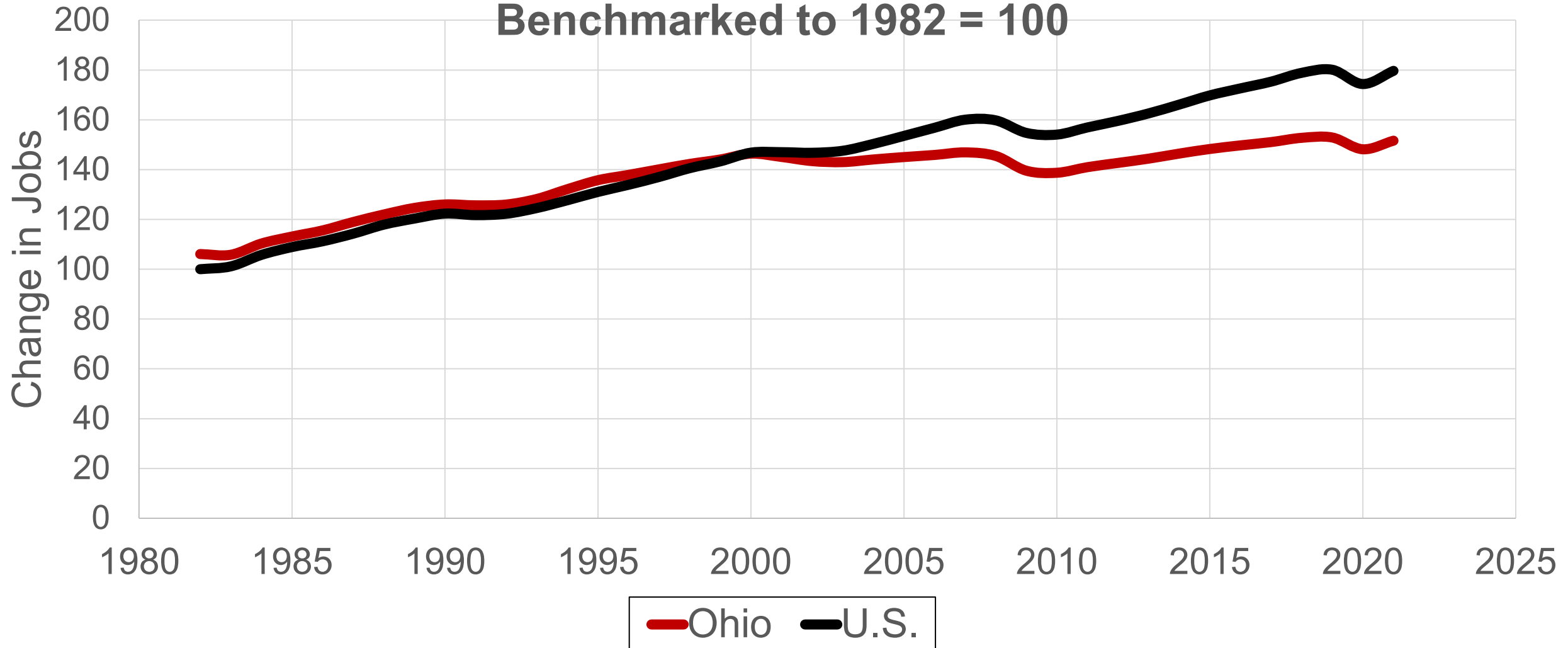
(December 2020 = 100)





Growth in Nonfarm Employment, Ohio Relative to the U.S. 1982-2021

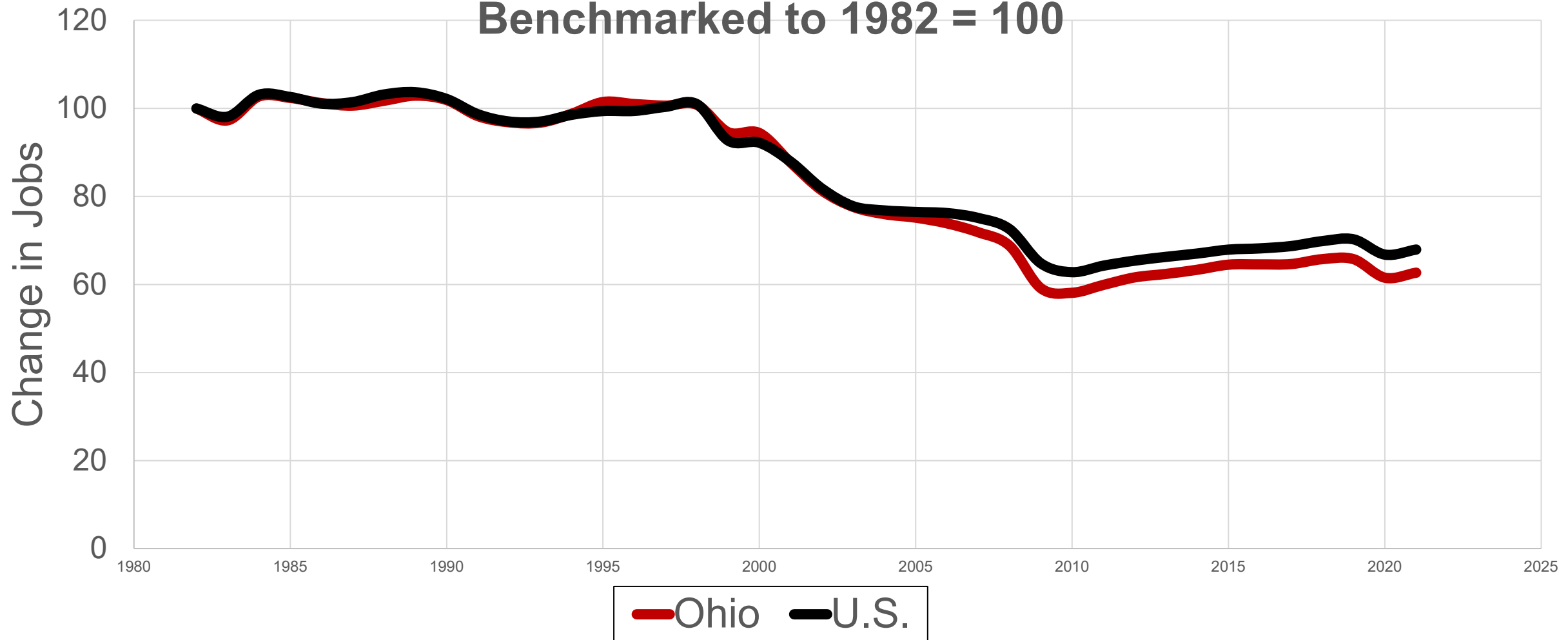
Benchmarked to 1982 = 100





Change in Manufacturing Jobs 1982 - 2021, Ohio Relative to the U.S.

Benchmarked to 1982 = 100

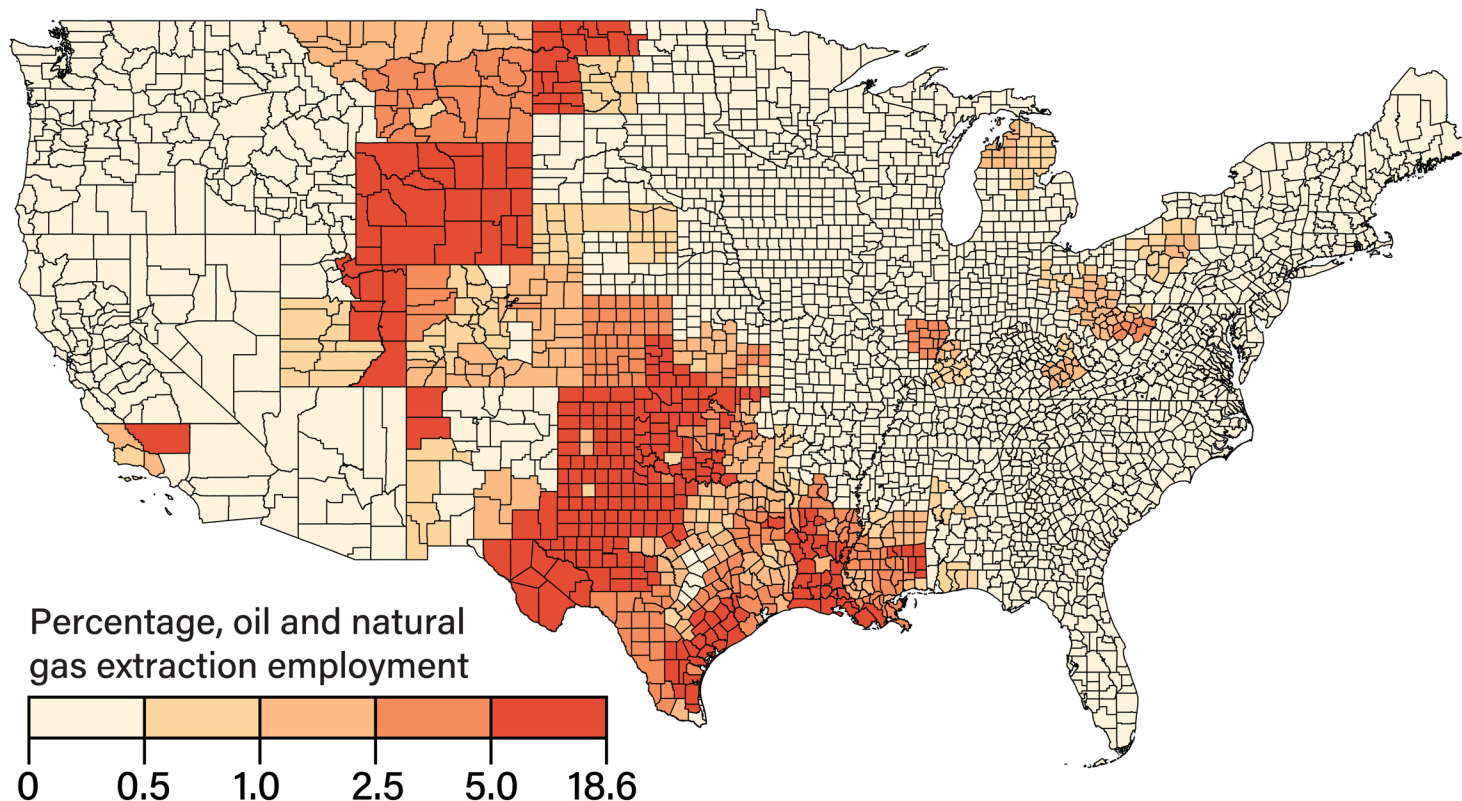




Share of county employment in oil and natural gas extraction, 1980



Economic Research Service
U.S. DEPARTMENT OF AGRICULTURE



Notes: Counties with greater than 2.5 percent of total employment from oil and natural gas extraction are classified as "boom counties." Research for this map focused only on the contiguous United States.

Source: USDA, Economic Research Service using data from the 1980 U.S. Census, Integrated Public Use Microdata Sample.



Behind in Small Business

Despite ranking **3rd in tax incentives** for site selection, **Ohio ranks 35th overall** in “best states to start a small business” based on Wallethub’s 2023 survey.

Ohio ranks 45th out of 50 in its small business environment score, which aggregates these metrics:

- Average Length of Work Week Share of Engaged Workers
- Growth in Number of Small Businesses
- Startups per Capita
- Growth of Average Business Revenues
- Five-Year Business Survival Rate
- Industry Variety
- Industry-Cluster Strength
- Entrepreneurship Index Share of Fast-Growing Firms
- “Digital States” Survey Grade
- Job Growth (2022 vs. 2018)
- GDP Growth (2021 vs. 2020)
- Percentage of Residents Who Are Fully Vaccinated Against COVID-19

Source: <https://wallethub.com/edu/best-states-to-start-a-business/36934>

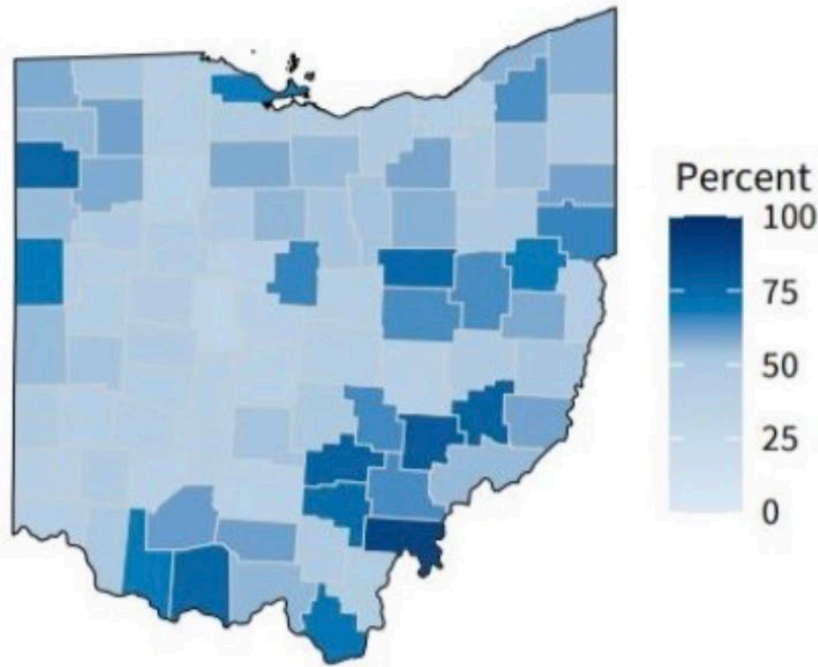
Best States to Start a Business

Overall Rank ↕	State	Total Score ↕	Business Environment ▲	Access to Resources ↕	Business Costs ↕
21	Michigan	49.32	36	24	6
43	North Dakota	43.34	37	45	27
28	Alabama	46.51	38	47	8
26	Illinois	46.89	39	6	37
29	Louisiana	46.29	40	43	12
45	Wyoming	42.66	41	48	28
44	Pennsylvania	42.84	42	20	34
20	Mississippi	49.37	43	30	2
36	Kansas	44.68	44	44	15
35	Ohio	45.21	45	37	13
37	Wisconsin	44.43	46	31	22
46	Rhode Island	42.03	47	16	36
40	Missouri	43.69	48	34	25
49	Connecticut	39.97	49	8	46
48	West Virginia	40.56	50	50	3



982,035 small businesses
99.6 percent of Ohio businesses

2.2 million small business employees
44.6 percent of Ohio employees



Share of employees working at small businesses by county

Source of data: [Statistics of US Businesses](#) (Census)



Samsung Vietnam plans to expand its investment in Vietnam (Photo: VNA)