



A Tale of Two Regions: The Economic and Political Importance of Different Paths to Heartland Renewal

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Industrial regions across the West have borne the brunt of global economic restructuring since the 1970s. Overwhelming forces such as globalized trade, the transition to a knowledge and service economy, accelerating automation and digitization, along with the rise of urbanized agglomeration economies, have restructured and relocated whole industries, and shifted capital and populations to fewer “winning” city regions, and away from the traditional industrial heartlands. From the Midwest in the United States to the Ruhr in West Germany, to Northern England and northeastern France, one sees the extent to which these forces have reshaped once-mighty industrial regions across most countries.

The residents of these regions, their attitudes and voting behaviors, have a disproportionate impact on the strength and stability of Western democracies. Declining economic opportunity and yawning geographic inequality provide fertile soil for demagogues to connect with residents—offering nostalgia, nationalism, and nativism as panacea to both understand and resurrect their communities. A recently released report by the European Commission, the [“Geographies of Discontent,”](#) empirically links regions stuck in long-term economic decline with the strongest anti-Europe and anti-system

voting patterns.¹ Another recent article, “[Left-behind versus Unequal Places](#),” illustrates how economic decline coupled with resentment about race and immigration explains far-right populism in the United States and Europe.²

Policymakers have begun to respond with greater urgency in recent years as these connections have become clear. In the United Kingdom, both major parties have committed to a program to “level-up” Northern England’s hollowed out manufacturing and mining communities, whose residents drove Brexit and turned the once reliable “Red Wall” against Labour and to the Conservatives in 2019. Similarly, President Biden’s three major legislative victories—the Bipartisan Infrastructure Law, the CHIPS and Science Act, and the Inflation Reduction Act—are unprecedented place-based investments, funneling hundreds of billions of dollars to distressed heartland communities to invest in new “tech-hubs,” semiconductor plants, green energy, new infrastructures, and good-paying, often [union jobs](#).³

In light of these initiatives, there is much to be learned on both sides of the Atlantic about how policymakers at national and regional levels can successfully navigate deindustrialization towards economic regeneration. As we recently published in [a more detailed report on regional structural policy](#), two regions to turn to for instruction are Germany’s Ruhr and the Pittsburgh metropolitan area in Pennsylvania.⁴ Both were the centers of their respective countries’ coal and steel industries throughout much of the 20th century and were symbols of their respective countries industrial might.

The concentration of industrial activity in these regions created a similar landscape of dense urban cores, and belching factories strewn across a topography of hills and rivers shrouded in smoke. In the 1970s and 1980s, both regions faced economic crisis as steel, coal, and related industries collapsed dramatically, shedding not tens, but hundreds of thousands of jobs over

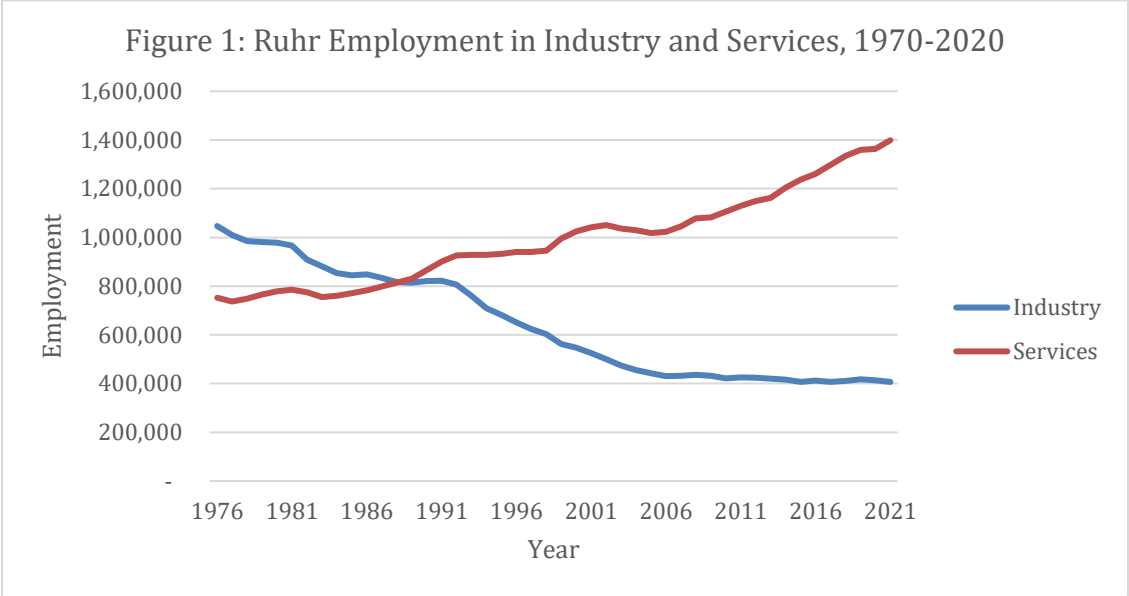
¹ Andrés Rodríguez-Pose, Lewis Dijkstra, and Hugo Poelman, “The Geography of EU Discontent and the Regional Development Trap” (Luxembourg: European Union, 2023), <https://data.europa.eu/doi/10.2776/164290>.

² Andrés Rodríguez-Pose, Javier Terrero-Dávila, and Neil Lee, “Left-behind versus Unequal Places: Interpersonal Inequality, Economic Decline and the Rise of Populism in the USA and Europe,” *Journal of Economic Geography*, April 17, 2023, lbad005, <https://doi.org/10.1093/jeg/lbad005>.

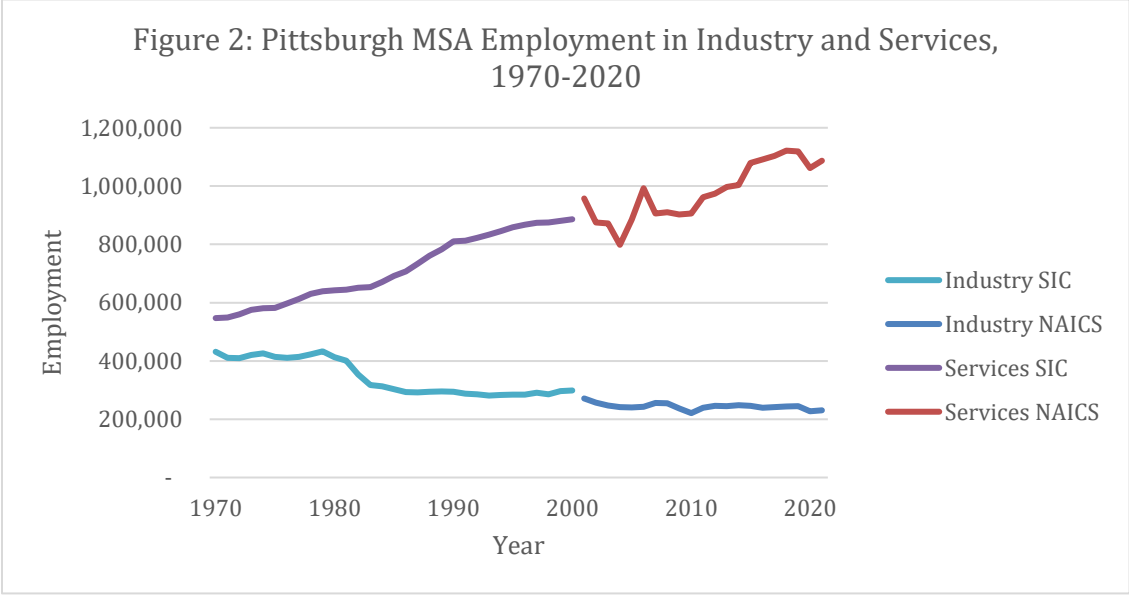
³ Jonathan Weisman, “As Federal Cash Flows to Unions, Democrats Hope to Reap the Rewards,” *The New York Times*, February 10, 2023, sec. U.S., <https://www.nytimes.com/2023/02/10/us/politics/democrats-biden-unions.html>. These three acts contain stipulations requiring companies to pay union wages and use union apprenticeship and training programs to gain access to federal incentives with the hope that companies will then hire union labor.

⁴ Lucas Kreuzer, “Regional Structural Policy in Pittsburgh and the Ruhr” (Chicago Council on Global Affairs, June 2023), <https://globalaffairs.org/sites/default/files/2023-06/Ruhr-Pitt-Regional-Policy-ShortReport.pdf>.

several decades. For example, the Ruhr’s industrial employment declined from 1.05 million to 547,495 between 1976 and 2000 (Figure 1). Similarly, the Pittsburgh metro’s industrial employment dropped from 410,979 to 289,725 in the same period (Figure 2).



(Source: Regionalverband Ruhr)⁵



(Source: Bureau of Economic Analysis). Note: SIC (pre-2000) and NAICS (post-2000) are two different industrial classification systems used by the federal government.⁶

⁵ Regionalstatistik Ruhr, “[Statistikportal Ruhr](#),” Regionalverband Ruhr, accessed September 17, 2023.

⁶ U.S. Bureau of Economic Analysis (BEA), “[Employment by County, Metro, and Other Areas | U.S. Bureau of Economic Analysis \(BEA\)](#),” U.S. Bureau of Economic Analysis (BEA), accessed September 17, 2023.

Yet, both regions have managed to transform their economies over recent decades, diversifying from their signature industries and growing their service sectors, and are today widely viewed as industrial regeneration success stories. But the Ruhr and Pittsburgh followed different paths as they restructured their regional economies with different outcomes in terms of economic growth, social stability, residents' attitudes, and the complexion of each region's politics.

The Case of Pittsburgh

In the absence of sustained federal or state support, Pittsburgh's strategy was driven by an evolving, entrepreneurial set of local coalition actors and organizations—made up of city and county governments, regional business leadership groups, universities, philanthropies, and non-profits. These public-private partners worked to redevelop the downtown and to activate universities and cultural institutions to build out a new cultural and knowledge-based economy.

City and business leaders first joined forces from 1945 to 1969 to implement *Renaissance I*, a plan to revitalize Pittsburgh's downtown through real estate development, the creation of green spaces, and the mitigation of flooding and air pollution. Major corporations such as US Steel, Mellon Bank, and Alcoa embraced the plan, and constructed modern skyscrapers and, working with the city, developed major green spaces such as Point State Park.⁷ This partnership continued between 1979 and 1982 with *Renaissance II*—a new plan and another round of investment and redevelopment of Pittsburgh's downtown.⁸

With the steel crisis pushing the region's economy off a cliff in the 1980s, Pittsburgh's local coalition expanded and adopted a new approach dubbed *Strategy 21*. Carnegie Mellon University, the University of Pittsburgh, Allegheny County, and even the state of Pennsylvania joined the city and business community to advance plans to reinvent the region's economy as a

⁷ Renee A. Berger and R. Scott Fosler, "Four Decades of Public-Private Partnerships in Pittsburgh," in *Public-Private Partnership in American Cities: Seven Case Studies* (Lexington, Mass: Lexington Books, 1982).

⁸ Sabina Detrick, "The Post Industrial Revitalization of Pittsburgh: Myths and Evidence," *Community Development Journal* 34, no. 1 (1999): 4–12; Robert E Gleeson and Jerry Paytas, "Pittsburgh: Economic Restructuring and Regional Development Patterns, 1880–2000," in *Sunbelt/Frostbelt: Public Policies and Market Forces in Metropolitan Development* (Brookings Institution Press, 2005); Roy Lubove, *Twentieth-Century Pittsburgh: The Post-Steel Era* (University of Pittsburgh Pre, 1995).

site of high technology, quality of life, and tourism. Together these partners financed several new research centers and office parks around the universities focused on emerging sectors of local excellence such as supercomputing, software engineering, and advanced manufacturing.

These centers quickly became magnets for winning additional federal research funding and grew as the locus of new public-private partnerships, innovation and technology development, and startups that sprung out of the nexus of universities, investors, and industry. *Strategy 21* also drew on Pittsburgh's strong foundation of cultural institutions by refurbishing museums and venues built by the likes of Heinz, Mellon, and Carnegie, rehabilitating the city's theater and cultural district, and constructing the Andy Warhol Museum and the Carnegie and Science Center.⁹

As *Strategy 21* ended, local leaders commissioned a report that confirmed that despite these significant efforts, the Pittsburgh metro was still lagging behind comparable industrial regions. Yet again, a regional coalition assembled. Between 1994 to the early 2000s the "Working Together Consortium" (WTC) formed and resulted in two major accomplishments.¹⁰ First, it created an investment fund to finance major regional infrastructure projects and the reuse of industrial sites for high-tech research and enterprises. Second, it led to enactment of a 1 percent sales tax across Allegheny County to support cultural institutions and which was tapped to build new stadiums for the Steelers and Pirates as well as to renovate Pittsburgh's convention center.¹¹

Pittsburgh's leaders deserve much credit for their decades of collaboration that succeeded in catalyzing a new cultural and knowledge-based economy growing out of the cities' legendary industrial bones. Carnegie Mellon University and the University of Pittsburgh have transformed Pittsburgh into an international center of excellence for applied research and new startup businesses related to computer science, robotics, and the health sciences. Nonetheless, this collaboration and these new businesses and jobs have led to

⁹ Lubove, *Twentieth-Century Pittsburgh*. Ch. 3; Ben Armstrong, "Industrial Policy and Local Economic Transformation: Evidence From the U.S. Rust Belt," *Economic Development Quarterly* 35, no. 3 (August 2021): 181–96, <https://doi.org/10.1177/08912424211022822>.

¹⁰ Brian D. Jacobs, *Strategy and Partnership in Cities and Regions: Economic Development and Urban Regeneration in Pittsburgh, Birmingham, and Rotterdam* (New York, N.Y: St. Martin's Press, 2000).

¹¹ Donald K. Carter, "Pittsburgh, Pennsylvania," in *Remaking Post-Industrial Cities: Lessons from North America and Europe* (New York, NY: Routledge, Taylor & Francis Group, 2016), Ch. 6; Allegheny Regional Asset District, "History | RAD Works Here," Allegheny Regional Asset District, accessed May 11, 2023, <https://www.radworkshere.org/pages/history>.

the re-population and new business growth in the urban core of Pittsburgh proper. They have not uplifted the countless “mill towns” located outside of the city along the Monongahela and Allegheny rivers decimated by the loss of jobs, population, and tax revenues.

Managing Economic Transition in the Ruhr Region

In contrast to Pittsburgh, the Ruhr transformed its economy and softened the blow of deindustrialization relying more on “top-down” financing and planning from the state of North Rhine-Westphalia (NRW), the Federal Republic of Germany (FRG), and the European Union. Beginning in the late 1950s, these bodies invested hundreds of billions of marks and euros—multiples more than the Pittsburgh metro ever received—focused on three priorities:

- First, the FRG and NRW subsidized the Ruhr’s coal industry and offered social welfare support and transitional aid for miners. Most famously, the *Kohlepfennig* (“coal penny”) mandated the use of domestic coal in power generation by placing a national tax on consumers to make up for the lower price of foreign coal between 1975 and 1995. Similar subsidies continued until 2018 when the last mine closed.¹² The FRG also funded social support and transitional support for miners ranging from money for early retirement to vocational training to moving assistance.¹³
- Second, the FRG and NRW designed and implemented numerous rounds of structural adjustment policy between the late 1950s to the early 2000s that invested heavily in the Ruhr’s infrastructure, education and research institutions, and environment. These plans funded new highways, ports, and public transit systems to create employment and to aid the region’s existing industries to be more competitive. They also established the region’s first universities and technical institutes.¹⁴

¹² Coal mines have recently reopened in Germany as a result of Russia’s war in Ukraine and the halting of Russian oil imports and the closure of domestic nuclear power plants.

¹³ Karl Storchmann, “The Rise and Fall of German Hard Coal Subsidies,” *Energy Policy* 33, no. 11 (July 2005): 1469–92, <https://doi.org/10.1016/j.enpol.2004.01.006>; Philipp Herpich, Hanna Brauers, and Pao-Yu Oei, “An Historical Case Study on Previous Coal Transitions in Germany,” 2018, 32; Pao-Yu Oei, Hanna Brauers, and Philipp Herpich, “Lessons from Germany’s Hard Coal Mining Phase-out: Policies and Transition from 1950 to 2018,” *Climate Policy* 20, no. 8 (September 13, 2020): 963–79, <https://doi.org/10.1080/14693062.2019.1688636>.

¹⁴ Olaf Arndt et al., “Lehren aus dem Strukturwandel im Ruhrgebiet für die Regionalpolitik” (Bremen/Berlin/Bochum: Bundesministerium für Wirtschaft und Energie (BMWi), September 14, 2015); Elke

Where there were once no institutions of higher education, today the Ruhr is home to the densest per capita network of higher-education in Germany, hosting four universities and eighteen technical and applied science institutes that employ 31,000 professors and researchers and educate approximately 290,000 students.¹⁵

- Finally, the plans for the Ruhr prioritized environmental remediation and the greening of the region, its community, and economy. Former steel and coal communities such as Bochum and Essen competed to be among the greenest communities in Europe. Initiatives like the IBA Emscher Park, a region-wide exhibition from 1989 to 1999, reconstructed former industrial lands and factories into parks, museums, and sculptures along the Emscher River.¹⁶

While the Ruhr's approach successfully eased the pain of economic restructuring—particularly for the hundreds of thousands of workers and their families dislocated by the decline of coal and steel, its current economic performance, on balance, is not as strong as Pittsburgh. While employment in services has grown, it is not clear that the region has been able to grow high tech and high valued-added service industries as effectively as Pittsburgh.

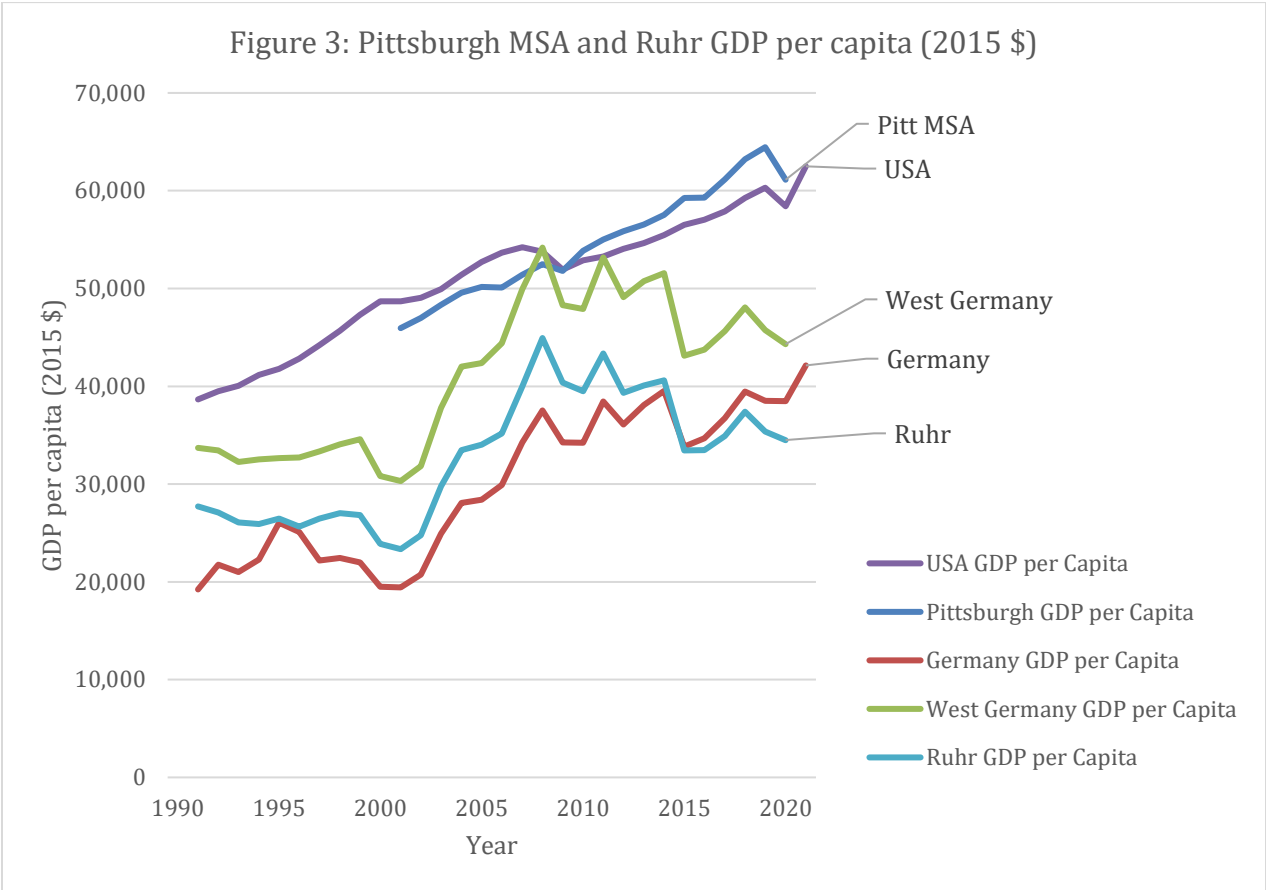
If anything, measures like the *Kohlepfennig* may have delayed a transition to a knowledge-based service economy and the Ruhr is now playing catch up. Comparing Figures 1 and 2 demonstrates that in Pittsburgh service employment surpassed industrial employment by 1970, while in the Ruhr, service employment only exceeded industrial employment around 1990. Furthermore, it is possible that the top-down plans led by FRG and NRW impeded the formation of the same regional public-private-university partnerships that Pittsburgh had activated by the 1980s.

Dahlbeck and Stefan Gärtner, "Just Transition for Regions and Generations: Experiences from Structural Change in the Ruhr Area" (Berlin: World Wildlife Fund Germany, January 2019); Béla Galgóczi, "The Long and Winding Road from Black to Green: Decades of Structural Change in the Ruhr Region," *International Journal of Labour Research* 6, no. 2 (2014): 217–40; Robert P Taylor, "A Review of Industrial Restructuring in the Ruhr Valley and Relevant Points for China," July 2015, 25; Robert Hassink and Matthias Kiese, "Solving the Restructuring Problems of (Former) Old Industrial Regions with Smart Specialization? Conceptual Thoughts and Evidence from the Ruhr," *Review of Regional Research* 41, no. 2 (October 2021): 131–55, <https://doi.org/10.1007/s10037-021-00157-8>.

¹⁵ "Wie Kooperationen das Ruhrgebiet zur Wissensregion machen," *Metropole Ruhr*, accessed June 25, 2023, <https://metropole.ruhr/artikel/bildung-und-wissen>.

¹⁶ Philip Pinch and Neil Adams, "The German Internationale Bauausstellung (IBA) and Urban Regeneration: Lessons from the IBA Emscher Park," in *The Routledge Companion to Urban Regeneration* (Routledge, 2013); Hillary Angelo, *How Green Became Good: Urbanized Nature and the Making of Cities and Citizens* (Chicago, IL: University of Chicago Press, 2021), <https://press.uchicago.edu/ucp/books/book/chicago/H/bo61910401.html>.

The faster transition to a knowledge-based service economy has resulted in stronger aggregate GDP per capita in Pittsburgh. Figure 3 demonstrates that Pittsburgh’s economy has outperformed the Ruhr’s economy in the last decade when compared to their respective countries. It compares the real GDP per capita of each region with those of the United States, West Germany, and Germany, which serve as national benchmarks, from 1991 to 2021.



(Source: Bureau of Economic Analysis and Statistisches Bundesamt)¹⁷

¹⁷ U.S. Bureau of Economic Analysis (BEA), “[GDP by County, Metro, and Other Areas](#),” U.S. Bureau of Economic Analysis (BEA), accessed September 17, 2023; U.S. Census Bureau, “[Resident Population in Pittsburgh, PA \(MSA\)](#),” FRED, Federal Reserve Bank of St. Louis (FRED, Federal Reserve Bank of St. Louis, January 1, 2000); Statistisches Bundesamt Deutschland, “[82111-0001: VGR der Länder \(Entstehungsrechnung\) - Bruttoinlandsprodukt zu Marktpreisen \(nominal\): Bundesländer, Jahre](#),” Text, 82111-0001: VGR der Länder (Entstehungsrechnung) - Bruttoinlandsprodukt zu Marktpreisen (nominal): Bundesländer, Jahre, November 27, 2022; “[12411-0010: Bevölkerung: Bundesländer, Stichtag](#),” Text, Statistisches Bundesamt Deutschland - GENESIS-Online, November 27, 2022; OECD, “[National Accounts: National Accounts Deflators: Gross Domestic Product: GDP Deflator for Germany](#),” FRED, Federal Reserve Bank of St. Louis (FRED, Federal Reserve Bank of St. Louis), accessed November 27, 2022.

Pittsburgh's GDP per capita was slightly below the national average but has grown to exceed the national average since 2010, suggesting that the economy is growing at a faster per capita rate in Pittsburgh than the United States as a whole. In contrast, the Ruhr has consistently fallen below the West German average and in 2016 it actually slipped below the total German average where it remains. Yet, the FRG and NRW's investments still planted the seeds in the Ruhr for future growth and the 21st century economy—including new universities, research centers, and highly educated and trained graduates to create the industries of the future—seeds that have sprouted, grown, and are beginning to bear fruit.

Contrasting Approaches, Contrasting Political Outcomes

The Ruhr and Pittsburgh's contrasting approaches to deal with dramatic industrial restructuring and nurture new economic growth have led to differences in the outlooks and political allegiances of each region's residents. The city of Pittsburgh and Allegheny County remain Democratic bastions undergirded by their diverse and educated populations. In contrast, the hollowed out, outer-lying communities have swung decisively from the Democratic Party to some of the strongest Trump-supporting areas in the country. For example, rural Washington County, which borders West Virginia, voted for John Kerry and the Democrats by a slim majority in 2004, but by 2016 Donald Trump carried the county with over 60% of the vote.¹⁸ The failure to extend economic opportunity widely beyond the city and the suburbs created a tinderbox for populist movements and leaders offering nostalgia and various scapegoats for the decline of community and economic opportunity for the remaining local residents.

In contrast, having evened out the impact of dramatic job losses across the region, the Ruhr's politics remain moderate with the Social Democrats having won a plurality in every federal election since reunification in 1990 and the Christian Democratic Union (the center-right party of Angela Merkel and Helmut Kohl) consistently coming in second place. The right-wing populist AfD party has gained steam in a few places such as coming in third place in cities like Gelsenkirchen that were hit especially hard by deindustrialization, but anti-European and anti-immigrant attitudes are far more modulated in the

¹⁸ David Leip, "[Dave Leip's Atlas of U.S. Presidential Elections - State Data.](#)" Dave Leip's Atlas of U.S. Presidential Elections, accessed September 17, 2023

Ruhr compared to Pittsburgh and other European regions facing economic decline.¹⁹ A sensitivity to the social consequences of deindustrialization, through measures such as the *Kohlepfennig* and region-wide investment in universities and the environment, likely lessened the pain of deindustrialization and helped preserve the Ruhr's population, economic base and social structures such that its citizens continued to support the Social Democrats and other centrist parties.

The different experiences and strategies for regeneration pursued by the Ruhr and Pittsburgh region—so eerily similar in their industrial base and economic development arc—demonstrate the power and importance of transatlantic exchanges of practice. Pittsburgh illustrates how it is possible to nurture a new high-tech economy from the region's industrial bones, but at the cost of exacerbating intra-regional economic divides—yielding a more polarized polity. The Ruhr reveals how to modulate the economic and social effects of deindustrialization and deter the rise of populism but has not been as successful at nurturing new jobs and business growth in specialized, high-valued added sectors.

As leaders on both sides of the Atlantic work to shape place-focused industrial policies that break new opportunity to regions struggling with their transition in a globalized, tech-driven economy, there is opportunity to harvest lessons from the different strategies of regions like Pittsburgh and the Ruhr. Lessons that include putting the strengths of each of these region's strategies together and perhaps reaping the benefits of both.

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¹⁹ Benedikt Brandhofer et al., "[Ergebnisse für alle Wahlkreise: Interaktive Karte zur Bundestagswahl 2021 für ganz Deutschland](#)," Tagesspiegel, September 20, 2021.

Works Cited

- Allegheny Regional Asset District. "History | RAD Works Here." Allegheny Regional Asset District. Accessed May 11, 2023. <https://www.radworkshere.org/pages/history>.
- Angelo, Hillary. *How Green Became Good: Urbanized Nature and the Making of Cities and Citizens*. Chicago, IL: University of Chicago Press, 2021. <https://press.uchicago.edu/ucp/books/book/chicago/H/bo61910401.html>.
- Armstrong, Ben. "Industrial Policy and Local Economic Transformation: Evidence From the U.S. Rust Belt." *Economic Development Quarterly* 35, no. 3 (August 2021): 181–96. <https://doi.org/10.1177/08912424211022822>.
- Arndt, Olaf, Kathleen Freitag, Carolin Karg, Florian Knetsch, Rolf G. Heinze, Fabian Beckmann, and Fabian Hoose. "Lehren aus dem Strukturwandel im Ruhrgebiet für die Regionalpolitik." Bremen/Berlin/Bochum: Bundesministerium für Wirtschaft und Energie (BMWi), September 14, 2015.
- Berger, Renee A., and R. Scott Fosler. "Four Decades of Public-Private Partnerships in Pittsburgh." In *Public-Private Partnership in American Cities: Seven Case Studies*. Lexington, Mass: Lexington Books, 1982.
- Brandhofer, Benedikt, Nico Büttner, Tamara Flemisch, David Meidinger, Hendrik Lehmann, and Helena Wittlich. "Ergebnisse für alle Wahlkreise: Interaktive Karte zur Bundestagswahl 2021 für ganz Deutschland." Tagesspiegel, September 20, 2021. <https://interaktiv.tagesspiegel.de/lab/bundestagswahl-2021-karte-historische-ergebnisse-wahlkreise-gemeinden/>.
- Carter, Donald K. "Pittsburgh, Pennsylvania." In *Remaking Post-Industrial Cities: Lessons from North America and Europe*, Ch. 6. New York, NY: Routledge, Taylor & Francis Group, 2016.
- Dahlbeck, Elke, and Stefan Gärtner. "Just Transition for Regions and Generations: Experiences from Structural Change in the Ruhr Area." Berlin: World Wildlife Fund Germany, January 2019.
- Detrick, Sabina. "The Post Industrial Revitalization of Pittsburgh: Myths and Evidence." *Community Development Journal* 34, no. 1 (1999): 4–12.
- Galgóczi, Béla. "The Long and Winding Road from Black to Green: Decades of Structural Change in the Ruhr Region." *International Journal of Labour Research* 6, no. 2 (2014): 217–40.
- Gleeson, Robert E, and Jerry Paytas. "Pittsburgh: Economic Restructuring and Regional Development Patterns, 1880–2000." In *Sunbelt/Frostbelt: Public Policies and Market Forces in Metropolitan Development*. Brookings Institution Press, 2005.
- Hassink, Robert, and Matthias Kiese. "Solving the Restructuring Problems of (Former) Old Industrial Regions with Smart Specialization? Conceptual Thoughts and Evidence from the Ruhr." *Review of Regional Research* 41, no. 2 (October 2021): 131–55. <https://doi.org/10.1007/s10037-021-00157-8>.

Herpich, Philipp, Hanna Brauers, and Pao-Yu Oei. "An Historical Case Study on Previous Coal Transitions in Germany," 2018, 32.

Jacobs, Brian D. *Strategy and Partnership in Cities and Regions: Economic Development and Urban Regeneration in Pittsburgh, Birmingham, and Rotterdam*. New York, N.Y: St. Martin's Press, 2000.

Leip, David. "Dave Leip's Atlas of U.S. Presidential Elections - State Data." Dave Leip's Atlas of U.S. Presidential Elections. Accessed September 17, 2023. <https://uselectionatlas.org/RESULTS/statesub.php?year=2016&off=0&elect=0&fips=42125&f=0>.

Lubove, Roy. *Twentieth-Century Pittsburgh: The Post-Steel Era*. University of Pittsburgh Press, 1995.

Lucas Kreuzer. "Regional Structural Policy in Pittsburgh and the Ruhr." Chicago Council on Global Affairs, June 2023. <https://globalaffairs.org/sites/default/files/2023-06/Ruhr-Pitt-Regional-Policy-ShortReport.pdf>.

Metropole Ruhr. "Wie Kooperationen das Ruhrgebiet zur Wissensregion machen." Accessed June 25, 2023. <https://metropole.ruhr/artikel/bildung-und-wissen>.

OECD. "National Accounts: National Accounts Deflators: Gross Domestic Product: GDP Deflator for Germany." FRED, Federal Reserve Bank of St. Louis. FRED, Federal Reserve Bank of St. Louis. Accessed November 27, 2022. <https://fred.stlouisfed.org/series/DEUGDPDEFSAISMEI>.

Oei, Pao-Yu, Hanna Brauers, and Philipp Herpich. "Lessons from Germany's Hard Coal Mining Phase-out: Policies and Transition from 1950 to 2018." *Climate Policy* 20, no. 8 (September 13, 2020): 963-79. <https://doi.org/10.1080/14693062.2019.1688636>.

Pinch, Philip, and Neil Adams. "The German Internationale Bauausstellung (IBA) and Urban Regeneration: Lessons from the IBA Emscher Park." In *The Routledge Companion to Urban Regeneration*. Routledge, 2013.

Regionalstatistik Ruhr. "Statistikportal Ruhr." Regionalverband Ruhr. Accessed September 17, 2023. <https://statistikportal.ruhr/#innovation-und-wirtschaft>.

Rodríguez-Pose, Andrés, Lewis Dijkstra, and Hugo Poelman. "The Geography of EU Discontent and the Regional Development Trap." Luxembourg: European Union, 2023. <https://data.europa.eu/doi/10.2776/164290>.

Rodríguez-Pose, Andrés, Javier Terrero-Dávila, and Neil Lee. "Left-behind versus Unequal Places: Interpersonal Inequality, Economic Decline and the Rise of Populism in the USA and Europe." *Journal of Economic Geography*, April 17, 2023, lbad005. <https://doi.org/10.1093/jeg/lbad005>.

Statistisches Bundesamt Deutschland. "82111-0001: VGR der Länder (Entstehungsrechnung) - Bruttoinlandsprodukt zu Marktpreisen (nominal): Bundesländer, Jahre." Text. 82111-0001: VGR der Länder (Entstehungsrechnung) - Bruttoinlandsprodukt zu Marktpreisen (nominal): Bundesländer, Jahre, November 27, 2022. <https://www->

genesis.destatis.de/genesis//online?operation=table&code=82111-0001&bypass=true&levelindex=0&levelid=1669585645694#abreadcrumb.

Statistisches Bundesamt Deutschland - GENESIS-Online. "12411-0010: Bevölkerung: Bundesländer, Stichtag." Text, November 27, 2022. <https://www-genesis.destatis.de/genesis//online?operation=table&code=12411-0010&bypass=true&levelindex=0&levelid=1669585833192#abreadcrumb>.

Storchmann, Karl. "The Rise and Fall of German Hard Coal Subsidies." *Energy Policy* 33, no. 11 (July 2005): 1469–92. <https://doi.org/10.1016/j.enpol.2004.01.006>.

Taylor, Robert P. "A Review of Industrial Restructuring in the Ruhr Valley and Relevant Points for China," July 2015, 25.

U.S. Bureau of Economic Analysis (BEA). "Employment by County, Metro, and Other Areas |

U.S. Bureau of Economic Analysis (BEA)." U.S. Bureau of Economic Analysis (BEA). Accessed September 17, 2023. <https://www.bea.gov/data/employment/employment-county-metro-and-other-areas>.

U.S. Bureau of Economic Analysis (BEA). "GDP by County, Metro, and Other Areas." U.S. Bureau of Economic Analysis (BEA). Accessed September 17, 2023. <https://www.bea.gov/data/gdp/gdp-county-metro-and-other-areas>.

U.S. Census Bureau. "Resident Population in Pittsburgh, PA (MSA)." FRED, Federal Reserve Bank of St. Louis. FRED, Federal Reserve Bank of St. Louis, January 1, 2000. <https://fred.stlouisfed.org/series/PITPOP>.

Weisman, Jonathan. "As Federal Cash Flows to Unions, Democrats Hope to Reap the Rewards." *The New York Times*, February 10, 2023, sec. U.S. <https://www.nytimes.com/2023/02/10/us/politics/democrats-biden-unions.html>.