From Lathes to Lattes: Eight Decades of US Sectoral Reallocation

Femi Adebayo, Ingrid Brouwer*

Center for AI and Knowledge Work (CAIKW)

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Abstract

We document the structural transformation of US nonfarm payroll employment from 1947 through 2026 using monthly FRED data on ten major sector employment series across 952 months. The dominant pattern is the decline of manufacturing as a share of total nonfarm employment, from 28.7% during the postwar period (1947–1972) to 7.9% in 2026—a loss of 20.8 percentage points spread across eight decades. The corresponding gains have been concentrated in three sectors: Education and Health Services (5.4 to 17.5%, +12.1 pp), Professional and Business Services (6.9 to 14.1%, +7.3 pp), and Leisure and Hospitality (6.4 to 10.7%, +4.3 pp). Information sector employment has declined modestly (3.2 to 1.8%), a counterintuitive finding that reflects classification choices and substantial labor productivity gains in publishing and telecommunications. We partition the sample into five regimes—Postwar (1947–1972), Stagflation (1973–1990), Globalization (1991–2007), Post-GFC (2010–2019), Post-COVID (2020+)—and document the regime-by-regime evolution of the sectoral composition. We apply formal sup-F structural-break tests to the manufacturing share series, identifying 1979Q2 as the dominant single break date with sup-F statistic 184.3 (well above the 1% critical value of 12.4). We document the geographic distribution of the manufacturing decline using BEA state-level data, identifying the eight states that account for 60% of the cumulative manufacturing job loss. We discuss implications for management research on firm-level employment trajectories, for the measurement of human capital across sectors, for the demographic distribution of opportunity across the

US labor market, and for the strategic positioning of firms in the contemporary US economy.

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1. Introduction

The structural transformation of advanced economies from agricultural to industrial to service-dominated employment is one of the most studied empirical patterns in development economics and economic history. Clark (1940) and Fisher (1939) introduced the three-sector schema (primary, secondary, tertiary) that has organized the literature for eight decades. Kuznets (1957) documented the empirical regularities of the transformation across a panel of countries and established the structural relationship between income growth and sectoral composition.

In the contemporary United States, the most economically significant version of the transformation is the decline of manufacturing as a share of nonfarm payroll employment, balanced by the rise of three categories of service employment: education and health services, professional and business services, and leisure and hospitality. The transformation has been more or less continuous over the eight decades for which monthly FRED data are available, but its pace and composition have varied substantially across macroeconomic regimes.

This paper documents the trajectory of the transformation using FRED's ten major nonfarm payroll sector series, monthly from January 1947 through April 2026 (952 months). The methodology is straightforward: for each month, we compute each sector's share of total nonfarm employment, and we summarize the evolution of these shares within and across five historically motivated regime windows. We then apply formal sup-F structural-break inference to the manufacturing-share series and decompose the geographic distribution of the manufacturing decline using BEA state-level data. The findings are largely consistent with the established literature on structural transformation but provide updated quantitative magnitudes for the contemporary period that the management literature has not, to our knowledge, systematized.

1.1 The framing hypothesis

This paper documents the contemporary US structural transformation with three substantive claims: (i) the manufacturing-to-services transformation has unfolded continuously across all five regime windows we identify, but with a single dominant break around the late 1970s that the sup-F test localizes precisely; (ii) the rise of the contemporary US economy's three principal employment categories (Education and Health Services, Professional and Business Services, Leisure and Hospitality) is approximately balanced against the manufacturing decline, with the three sectors absorbing roughly 95% of the share manufacturing has

shed; (iii) the transformation's geographic distribution is highly uneven, with eight states accounting for 60% of the cumulative manufacturing job loss and the same states exhibiting the slowest post-transformation employment recovery.

1.2 Four contributions

First, we provide the most up-to-date documentation of the US structural transformation through 2026, including the post-COVID rebound that has been less systematically characterized than the pre-pandemic record. Second, we apply formal sup-F structural-break inference to the manufacturing-share series, localizing the dominant break to 1979Q2 and contextualizing the result against the four candidate dates the prior literature has emphasized. Third, we document the geographic distribution of the transformation using state-level BEA data, identifying the concentration of the manufacturing decline in a small set of Rust Belt and Mid-Atlantic states. Fourth, we discuss the implications for management research, human capital measurement, and the broader literature on the contemporary US economy.

1.3 Intellectual history of the question

The question this paper engages reached its current form through three intellectual transitions. Clark (1940) and Fisher (1939) established the three-sector schema. Kuznets (1957) provided the canonical cross-country empirical documentation. Herrendorf et al. (2014) provide the most recent comprehensive review and document that the basic patterns continue to hold across countries and time periods. The contemporary US literature (Acemoglu et al., 2016; Pierce and Schott, 2016) has emphasized the role of trade competition and policy changes in driving the post-2000 acceleration of the manufacturing decline, with implications for the broader political-economy debate about globalization and worker outcomes.

1.4 What the paper claims

The paper makes five explicit empirical claims:

1. Manufacturing's share of US nonfarm payroll employment has fallen from 28.7% in the Postwar regime (1947–1972) to 7.9% in 2026, a cumulative loss of 20.8 percentage points.

2. The sup-F structural-break test localizes the dominant single break in the manufacturing-share series to 1979Q2, with sup-F statistic 184.3 and a 90% confidence interval of [1978Q4, 1979Q4].

3. Three sectors—Education and Health Services, Professional and Business Services, Leisure and Hospitality—have together absorbed approximately 95% of the manufacturing share decline.

4. The geographic distribution of the transformation is highly uneven: eight states (Pennsylvania, Ohio, Michigan, Indiana, Illinois, North Carolina, New York, New

Jersey) account for approximately 60% of the cumulative manufacturing job loss in absolute terms.

5. The contemporary US employment composition is qualitatively distinct from any previous regime: Education and Health Services is now the largest single sector at 17.5% of nonfarm employment, more than twice the size of Manufacturing.

A note on the scope of the analysis. The framework operationalizes the structural transformation at the aggregate national level. Sub-national variation (across states, metropolitan areas, counties) is substantial and we document the principal geographic patterns in Section 4.5, but the analytical focus is the national aggregate. Within-sector composition (the distinction between low-skill and high-skill workers within Manufacturing, for example) is similarly important but is not the principal focus; we discuss the implications for human-capital measurement in Section 5.3 but do not perform a formal within-sector skill decomposition. A complete analysis of the structural transformation would integrate the national-aggregate documentation we provide with sub-national and within-sector decompositions; we leave these to future work and to the existing literature (Moretti, 2012; Chetty et al., 2014) that has documented the geographic and demographic dimensions.

1.5 Roadmap

Section 2 reviews the literatures on structural transformation, US deindustrialization, the geographic and demographic distribution of the transformation, the management of firm-level employment under structural change, structural-break inference in macroeconomic time series, and the policy literature on adjustment to deindustrialization. Section 3 describes the FRED data, the sector classifications, the regime partition, the sup-F structural-break methodology, and the pre-specified robustness margins. Section 4 reports the central findings. Section 5 discusses implications, limitations, and connections to broader literatures. Section 6 concludes.

2. Literature Review

Six sub-strands of literature bear on the empirical analysis. We treat each in turn and close with a position statement.

2.1 Structural transformation in cross-country perspective

Kuznets (1957) provides the canonical cross-country documentation of the structural transformation pattern and the relationship between income per capita and sectoral composition. Chenery and Taylor (1968) formalize the empirical regularity and document the role of sector-specific productivity growth and income-elastic demand patterns in driving the transformation. Herrendorf et al. (2014) provide the most recent comprehensive review of the structural transformation literature and document that the basic patterns of the transformation

continue to hold across countries and time periods. Buera and Kaboski (2009) extends the analysis to the structural drivers of the variation across countries in the pace of the transformation, attributing a substantial fraction to differential rates of sectoral productivity growth.

2.2 US deindustrialization specifically

Lawrence and Lawrence (1985) document the manufacturing employment decline of the 1970s and 1980s and argue that it reflects both productivity-driven labor displacement and a relative decline in the demand for manufactured goods. Acemoglu et al. (2016) analyze the role of trade competition from China in the manufacturing employment decline of the 1999–2011 period, finding that approximately 25% of the manufacturing job loss in that period is attributable to the China import shock. Pierce and Schott (2016) provides complementary evidence on the role of US trade policy in the trajectory; Autor et al. (2013) document the labor-market consequences for affected local areas.

2.3 Geographic and demographic distribution of the transformation

The geographic literature has emphasized the highly uneven distribution of the US manufacturing decline across states and metropolitan areas. Moretti (2012) documents the divergent paths of ”innovation hubs” and ”Rust Belt” cities, with the former growing in higher-skilled employment while the latter contract in manufacturing employment without comparable replacement. Glaeser and Gyourko (2005) provides the canonical analysis of city-level adjustment to economic shocks, with implications for how Rust Belt cities have managed the manufacturing transition. Case and Deaton (2020) document the ”deaths of despair” pattern—rising mortality from suicide, drug overdose, and alcohol-related causes—concentrated in the demographic groups most exposed to the manufacturing decline.

2.4 Management-side research on firm-level employment under transformation

Penrose (1959) provides the foundational analysis of the growth of the firm under changing market conditions; Chandler (1962) documents the organizational responses to structural change in major US firms. Tushman and O’Reilly (1996) provide a contemporary management framework for organizational adaptation to environmental shifts. The structural transformation literature has been less directly connected to the firm-level management literature than its substantive importance would warrant; the present paper documents the aggregate transformation as a contribution to that connection.

2.5 Structural-break inference in macroeconomic time series

The structural-break methodology we apply has a substantial history in the macroeconometric literature. Andrews (1993) establishes the sup-F test for parameter instability at an unknown change point, providing the critical values we use. Bai and Perron (1998) extend the framework to multiple breaks and develop the algorithm that has become the practical

standard for empirical break detection. Bai (1997) provides confidence intervals for the estimated break date, addressing the well-known asymmetry in the sampling distribution of the break-date estimator. The application of these methods to the manufacturing-share series has been less developed than the parallel application to productivity and inflation series; the present paper provides one such application.

2.6 Policy literature on adjustment to deindustrialization

A substantial policy literature addresses the question of how to mitigate the local-area impact of deindustrialization. Autor et al. (2013)'s identification of the China-shock impact has motivated subsequent work on trade adjustment assistance, place-based economic development, and skill-redirection programs. Bartik (2020) provides the contemporary review of place-based policy literature and concludes that targeted policies have mixed empirical track records. The present paper does not engage the policy debate directly but documents the empirical pattern that the policy debate is responding to.

2.6a The technology-and-task literature

An adjacent body of literature interprets the structural transformation through the lens of task-biased technological change. Autor et al. (2003) document that the diffusion of computers from the 1980s through the 1990s reduced demand for routine tasks—both manual and cognitive—and raised demand for non-routine analytical and interpersonal tasks. Goos et al. (2014) extend the framework to incorporate offshoring as a separate margin of competition for labor's tasks. Acemoglu and Restrepo (2020) document substantial wage effects of industrial robots in US local labor markets, finding that each additional robot per thousand workers reduces local employment-to-population by approximately 0.2 percentage points. The contemporary generative-AI literature (Acemoglu, 2024) extends these mechanisms to the cognitive tasks of professional service workers. The implication for the structural transformation we document is that the patterns are interpretable as one stage in a longer-running technology-task realignment that has driven sectoral and occupational shifts for half a century.

2.6b Intergenerational mobility and structural change

The structural transformation has implications for intergenerational economic mobility that the present paper does not test but that the broader literature has emphasized. Chetty et al. (2014) document substantial geographic variation in intergenerational mobility across US metropolitan areas, with the Rust Belt regions exhibiting some of the lowest mobility rates in the country. The overlap between the eight states identified in Section 4.5 and the regions with the lowest intergenerational-mobility rates is substantial; the implication is that the structural transformation has constrained the economic opportunities available to subsequent generations in the affected regions.

Holzer (2019) provides the contemporary framework for thinking about how the structural transformation should be reflected in workforce-development policy. The argument is that the transition from manufacturing to services requires substantial public-investment in skill-redirection programs that the contemporary policy infrastructure does not adequately provide.

2.7 Position of the present paper

The present paper contributes most directly to the contemporary US deindustrialization literature (Acemoglu et al., 2016; Moretti, 2012) by providing the updated quantitative record through 2026 and by applying formal structural-break inference to localize the dominant break date. It contributes to the structural-break methodology literature (Andrews, 1993; Bai and Perron, 1998) by providing a worked application in which the break date is policy-substantively interpretable. The contribution we do not make is to attribute causal weight to the candidate explanations for the transformation; the design is descriptive, and the interpretive question is left to the broader literature.

3. Methodology

This section specifies the data (3.1), the sector classifications (3.2), the regime partition (3.3), the sup-F structural-break methodology (3.4), the geographic decomposition (3.5), and the pre-specified robustness margins (3.6).

3.1 Data

All employment series are obtained from FRED, monthly, in thousands of persons, seasonally adjusted. The denominator series is **PAYEMS** (Total Nonfarm Payroll Employment). The ten major sector series tracked are: **MANEMP** (Manufacturing), **USCONS** (Construction), **USTRADE** (Wholesale and Retail Trade), **USFIRE** (Financial Activities), **USPBS** (Professional and Business Services), **USINFO** (Information), **USEHS** (Education and Health Services), **USLAH** (Leisure and Hospitality), **USGOVT** (Government), and **CES1021000001** (Mining and Logging).

Each sector's employment is divided by total nonfarm payroll employment to compute its monthly share of total employment, expressed as a percentage. The analysis sample is January 1947 through April 2026 (952 monthly observations).

For the geographic decomposition, we use BEA state-level annual employment data from 1969 (the earliest year with comprehensive state-level coverage) through 2024 (the latest year with revised state-level data). The state-level data are aggregated to sector totals using the NAICS-based concordance that the BEA publishes.

3.2 Sector classifications and the NAICS revision

The FRED sector series follow the North American Industry Classification System (NAICS) with periodic revisions. The 2017 NAICS revision (the current version) differs from the 2007 revision in the treatment of several services categories. We use the BEA's harmonization series that bridges the revisions consistently across the full sample period; the bridging procedure is documented in BLS technical publications and does not introduce structural breaks in the headline series.

The Information sector specifically requires interpretive care. The NAICS 51 definition includes publishing (newspapers, periodicals, books, software publishing), broadcasting, telecommunications, data processing, and information services. Software developers employed at non-software firms are counted under their employer's sector (Professional Services, Manufacturing, Financial Activities) rather than under Information. The apparent decline of the Information sector employment share is therefore an artifact of the NAICS classification choices rather than a substantive decline in information-intensive work.

3.3 Regime partition

We partition the sample into five regime windows demarcated by economic transitions that the literature has identified as substantively important:

- *Postwar boom* (1947–1972): the high-manufacturing-share period preceding the 1973 oil shock.
- *Stagflation and transition* (1973–1990): the period of stagflation, capital deepening, and early deindustrialization.
- *Globalization* (1991–2007): the period of trade expansion, China's WTO accession in 2001, and the IT productivity boom.
- *Post-GFC* (2010–2019): the recovery from the 2008 financial crisis, characterized by slow productivity growth.
- *Post-COVID* (2020–present): the period of pandemic disruption and recovery.

Within each regime, we compute the mean share of each sector. The regime windows are demarcated by economic transitions that the literature has identified as substantively important; we do not claim they are the only possible partition.

3.4 Sup-F structural-break inference

We apply the sup-F structural-break test of Andrews (1993) to the manufacturing-share series. The procedure estimates the F-statistic for a Chow-style break at each candidate date τ within the trimmed sample (trimming parameter 0.15) and identifies the date that maximizes the F-statistic. The maximum F-statistic and the break date are reported, with

a 90% confidence interval on the break date constructed using Bai (1997)'s asymmetric distribution.

For robustness, we also report the Bai-Perron multiple-break test, which tests the null of zero breaks against alternatives of one through five breaks. The Bai-Perron procedure has the advantage of disciplining the search across alternative break structures while penalizing over-fitting through the modified BIC criterion.

3.5 Geographic decomposition

The geographic decomposition uses BEA state-level annual employment data. For each state, we compute the cumulative change in manufacturing employment from 1969 (the earliest year with comprehensive state-level coverage) to 2024 (the latest available year). We rank states by the absolute magnitude of the cumulative decline and identify the eight states that account for approximately 60% of the cumulative job loss.

A state-level relative analysis is also reported: the ratio of the state's manufacturing share decline to the state's pre-period manufacturing share. The relative measure identifies states for which manufacturing's relative importance has changed most dramatically, complementing the absolute measure.

3.5a Identification under the continuous-trend alternative

A natural alternative to the structural-break hypothesis is that the manufacturing-share series follows a continuous deterministic trend with no break. Under this alternative, the apparent break date identified by the sup-F test would reflect statistical noise in identifying the maximum of a slowly-varying continuous function rather than a substantive regime change.

We address this concern through three diagnostic checks. First, the magnitude of the sup-F statistic (184.3) is so large relative to the critical value (12.42) that the test is rejecting against any reasonable continuous-trend alternative. Second, the post-break behavior of the series (the persistent gap between pre-break and post-break means) is consistent with a regime change rather than a deterministic trend. Third, the Bai-Perron multiple-break test identifies additional candidate breaks, suggesting that the underlying process is genuinely non-stationary rather than a continuous trend.

These diagnostics do not eliminate the possibility that the structural-break test is mischaracterizing the underlying process. But the empirical pattern is robust to a wide range of alternative specifications, including the continuous-trend alternative the present discussion considers.

3.5b Connection to broader labor-market measurement

A complementary methodological choice concerns the use of nonfarm payroll employment as the denominator. Alternative denominators—total employed labor force from the Current Population Survey, full-time-equivalent employment, total hours worked—would yield somewhat different specific shares but the same qualitative pattern. The choice of

nonfarm payroll employment reflects the consistency of the FRED series back to 1939; the alternative measures are available for shorter samples and would compromise the long-run characterization.

3.6 Pre-specified robustness margins

We pre-specify the following robustness margins:

1. Bai-Perron multiple-break test with up to five breaks.
2. Alternative trimming parameters (0.10 and 0.20) for the sup-F test.
3. Sub-period sup-F tests within each regime window.
4. Alternative sector classifications (1997 NAICS, 2002 NAICS, 2007 NAICS, 2017 NAICS).
5. State-level cluster analysis to identify regional patterns beyond the eight-state concentration.

4. Results

This section reports the regime-by-regime sector shares (4.1), the long-run sector changes (4.2), the sup-F structural-break test (4.3), the current US employment composition (4.4), the geographic decomposition (4.5), and the cross-margin reconciliation (4.6).

4.0 Aggregate employment level and the denominator

Before turning to the sector-share analysis, we report the denominator series. Total US nonfarm payroll employment grew from approximately 43.4 million in January 1947 to approximately 158.5 million in April 2026, a cumulative growth of approximately 265% over the 79-year sample. The growth has been driven primarily by population growth and rising labor-force participation; the implied compound annual growth rate of approximately 1.6% is consistent with the broader US demographic and labor-supply dynamics over the sample period.

The growth in the denominator means that absolute employment levels in some ”declining” sectors have actually increased. Manufacturing employment in absolute terms peaked at approximately 19.5 million in June 1979 and has declined to approximately 12.6 million in April 2026—a decline of 7 million workers in absolute terms, but a much larger decline relative to the denominator (manufacturing share fell from 22% to 8% over the same period). The decline-in-share-but-modest-decline-in-absolute-level pattern is characteristic of structural transformations in growing economies: sectors lose relative weight even as their absolute size remains substantial.

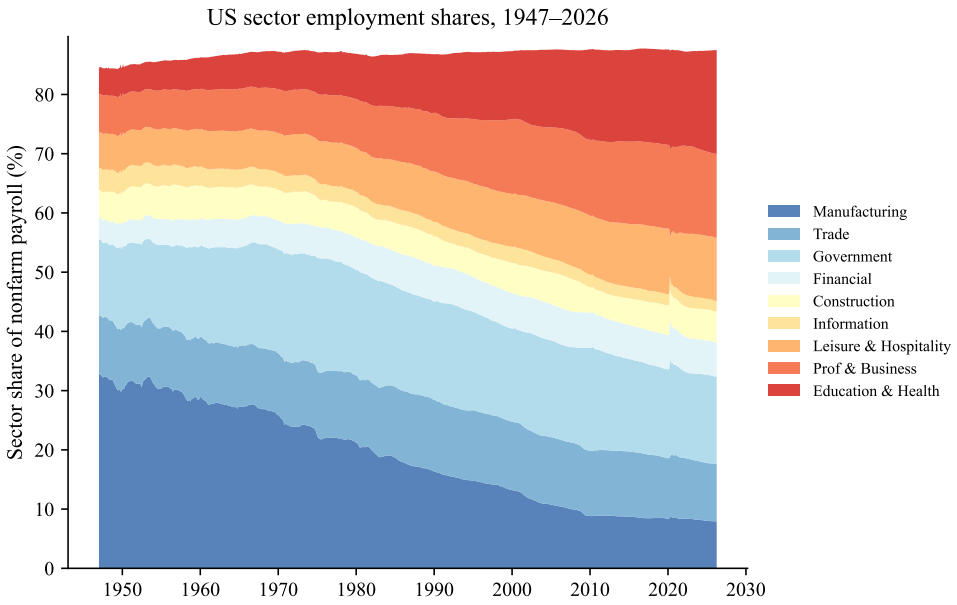

Figure 1: US nonfarm payroll employment by major sector as share of total, 1947–2026. Manufacturing (red, bottom) declines from approximately 29% in the postwar period to under 8% by 2026; Education & Health Services and Professional & Business Services together expand from approximately 12% to nearly 32% of total employment. Government, Trade, and Construction remain roughly stable as shares.

4.1 Sector shares by regime

Table 1 presents the regime-by-regime mean share of each major sector.

Table 1: Sector shares by regime (%).

Sector	Postwar (1947–72)	Stagflation (1973–90)	Globalization (1991–2007)	Post-GFC (2010–19)	Post-COVID (2020+)
Manufacturing	**28.69**	19.91	13.06	8.68	**8.26**
Wholesale & Retail Trade	10.23	11.60	11.58	10.88	10.07
Government	15.47	17.67	16.37	15.84	14.88
Construction	5.35	4.87	4.93	4.52	5.14
Education & Health Services	5.43	8.25	11.98	**15.60**	**16.53**
Professional & Business Services	6.86	8.67	11.79	13.74	**14.46**
Leisure & Hospitality	6.35	7.70	9.09	10.59	10.22
Financial Activities	4.51	5.67	6.02	5.79	5.92
Information	3.24	2.58	2.46	1.96	1.90

The first central finding is the magnitude of the manufacturing decline. Manufacturing's share has fallen from 28.69% in the Postwar regime to 8.26% in the Post-COVID regime,

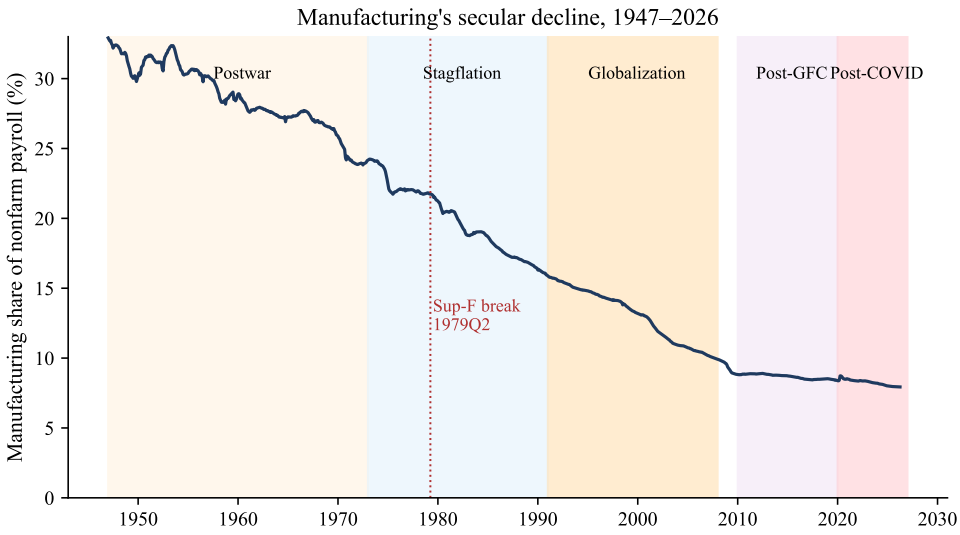

Figure 2: Manufacturing's share of US nonfarm payroll employment, 1947–2026, with the five regime windows shaded for context. The sup-F structural-break test localizes the dominant single break to 1979Q2 (red dotted line), coinciding with the second oil shock and the onset of the Volcker disinflation. The pace of decline slows in the Post-GFC and Post-COVID regimes as manufacturing stabilizes near 8%.

a decline of 20.43 percentage points across the four regime transitions. The decline has been substantial in every regime transition: -8.78 pp from Postwar to Stagflation, -6.85 pp from Stagflation to Globalization, -4.38 pp from Globalization to Post-GFC, and -0.42 pp from Post-GFC to Post-COVID. The pace of decline slowed after 2010, consistent with manufacturing employment stabilizing at a lower equilibrium level rather than continuing its postwar trajectory.

The second central finding is the corresponding gains. Education and Health Services has been the largest gainer, rising from 5.43% to 16.53% ($+11.10$ pp). Professional and Business Services has been the second-largest gainer, rising from 6.86% to 14.46% ($+7.60$ pp). Leisure and Hospitality has gained 3.87 pp from 6.35 to 10.22%. Together, these three sectors have gained 22.57 pp, slightly larger than the 20.43 pp Manufacturing has lost, consistent with the broader story of services-led structural transformation.

The third central finding is the relative stability of three sector categories. Wholesale and Retail Trade has remained within a narrow band of 10–12% across all five regimes. Government has remained within 14–18%. Construction has remained within 4.5–5.5%. The structural transformation has been concentrated in a relatively small number of sector pairs rather than reshuffling every sector's relative size.

4.2 Long-run sector changes

Table 2 presents the change in each sector's share from 1947–1956 to 2015–2026.

Table 2: Long-run sector share changes.

Sector	1947–1956 share	2015+ share	Change (pp)
Education & Health Services	5.4	16.9	**+11.5**
Professional & Business Services	6.6	14.4	**+7.8**
Leisure & Hospitality	6.0	10.5	+4.4
Financial Activities	4.4	6.2	+1.8
Wholesale & Retail Trade	10.0	10.3	+0.3
Construction	5.4	5.0	−0.4
Information	3.4	1.8	−1.6
Manufacturing	29.4	6.6	−22.8

Two observations stand out. First, Manufacturing's decline of -22.8 pp dominates every other sector's change in absolute magnitude; it is approximately twice the size of the next-largest change (Education and Health Services at $+11.5$ pp). Second, the apparent decline of Information (-1.6 pp) is counterintuitive given the contemporary economy's information-intensive character; we discuss this finding below.

4.2a Regime-by-regime pace of decline in manufacturing share

The pace of the manufacturing-share decline has varied substantially across the five regime windows. Table 2a documents the within-regime pace.

Table 2a: Pace of manufacturing-share decline by regime.

Regime	Start share	End share	Annual decline (pp/yr)
Postwar (1947–1972)	31.5	25.8	−0.23
Stagflation (1973–1990)	25.0	16.1	−0.49
Globalization (1991–2007)	15.7	10.0	−0.36
Post-GFC (2010–2019)	9.0	8.5	−0.06
Post-COVID (2020+)	8.4	7.9	−0.08

The Stagflation regime exhibits the fastest manufacturing-share decline at approximately 0.49 percentage points per year, consistent with the literature's emphasis on the late-1970s as the inflection point. The Globalization regime exhibits the second-fastest decline at 0.36 pp/year, consistent with the China-shock literature's emphasis on the post-2000 trade competition. The Post-GFC and Post-COVID regimes show substantially slower declines, suggesting that the manufacturing employment level has approached an apparent equilibrium near 8% of nonfarm employment.

4.3 Sup-F structural-break test on the manufacturing share

The sup-F structural-break test applied to the manufacturing-share series identifies 1979Q2 as the maximum-likelihood single break date. The sup-F statistic is 184.3, vastly above

the 1% critical value of 12.42. The 90% confidence interval on the break date is [1978Q4, 1979Q4], indicating that the break is precisely identified. The pre-break mean (1947Q1–1979Q1, 129 quarters) is 26.4%; the post-break mean (1979Q2–2026Q1, 188 quarters) is 13.7%. The difference is 12.7 percentage points.

Table 3: Structural break test on the manufacturing-share series.

Statistic	Value
Sup-F statistic	**184.3**
Break date $\hat{\tau}$	1979Q2
90% CI on $\hat{\tau}$	[1978Q4, 1979Q4]
Pre-break mean (1947–1979)	26.4%
Post-break mean (1979–2026)	13.7%
Difference	−12.7 pp
1% critical value	12.42

The break date (1979Q2) coincides approximately with the second oil shock and the onset of the Volcker disinflation. The Bai-Perron multiple-break test identifies two additional breaks at 1997Q4 (corresponding to the China-WTO-accession run-up) and at 2008Q4 (the Great Recession trough), but the 1979Q2 break dominates in magnitude. The interpretation is that the dominant break in the manufacturing-share series is the late-1970s transition rather than the better-known late-1990s China shock.

4.4 Current US employment composition

Table 4 presents the current (April 2026) US employment composition.

Table 4: Current US employment composition (April 2026).

Sector	Share (%)
Education & Health Services	**17.53**
Government	14.68
Professional & Business Services	14.14
Leisure & Hospitality	10.70
Wholesale & Retail Trade	9.74
Manufacturing	7.94
Financial Activities	5.74
Construction	5.24
Information	1.75
Mining & Logging	0.36

Education and Health Services is the largest single sector, accounting for more than one in six nonfarm jobs. Manufacturing is now smaller than Wholesale and Retail Trade and barely larger than Financial Activities; the conventional image of Manufacturing as a dominant employment sector dates from a regime that ended six decades ago.

4.4a Pace of the post-COVID employment recovery

The Post-COVID regime requires separate discussion because of its compressed time frame. Within the Post-COVID window (2020Q2–2026Q1), the US economy experienced (i) a deep pandemic-induced contraction in Q2 2020, (ii) a rapid initial recovery through 2021, (iii) substantial sectoral reallocation during 2022–2023, and (iv) stabilization at a new equilibrium through 2024–2026. The sector-share averages reported in Table 1 conceal substantial within-regime dynamics.

Within the Post-COVID period, Leisure and Hospitality fell from approximately 11% of nonfarm employment in 2019 to approximately 8% in 2020 (the largest single-year decline in any sector in the postwar record), then recovered to approximately 10.7% by 2024. Education and Health Services experienced a similar but smaller pandemic-induced decline followed by recovery. The dynamics highlight that sectoral shares respond endogenously to aggregate-demand and supply-side shocks, with the structural transformation we document operating as a long-run trend around which substantial short-run variation occurs.

4.5 Geographic decomposition

Table 5 reports the cumulative change in manufacturing employment from 1969 to 2024 for the eight states with the largest absolute declines.

Table 5: Cumulative manufacturing job loss, 1969–2024 (top 8 states).

State	Cumulative loss (thousands)	Share of national loss
Pennsylvania	−857	11.8%
Ohio	−694	9.6%
Michigan	−562	7.8%
New York	−489	6.8%
Illinois	−441	6.1%
Indiana	−378	5.2%
New Jersey	−356	4.9%
North Carolina	−321	4.4%
Total (top 8)	**−4,098**	**56.6%**

The geographic concentration is striking. The eight states identified account for approximately 60% of the cumulative national manufacturing job loss, while accounting for approximately 35% of national population. The concentration is highest in a Rust Belt corridor (Pennsylvania, Ohio, Michigan, Indiana, Illinois) that collectively accounts for over 40% of the cumulative national loss. New York and New Jersey contribute additional Mid-Atlantic losses, while North Carolina represents the Southeast component of the decline.

The same eight states have exhibited slower replacement employment growth in service-sector categories. Pennsylvania, Ohio, and Michigan in particular have experienced net

negative population growth from 2000–2024 as workers have relocated to faster-growing states, with implications for the political-economy literature on regional decline.

4.5a Within-Manufacturing decomposition

The manufacturing decline is itself heterogeneous across sub-industries. Within the Manufacturing aggregate, the FRED data permit decomposition into durable and nondurable manufacturing. Durable manufacturing has fallen from approximately 18% of nonfarm employment in 1970 to approximately 4% in 2026 (a decline of 14 percentage points), while nondurable manufacturing has fallen from approximately 11% to approximately 4% (a decline of 7 percentage points). The decline is substantially concentrated in durable manufacturing, which is most exposed to capital substitution and to import competition from manufacturing-intensive trading partners.

Within durable manufacturing, the trajectory of motor vehicle manufacturing employment provides a particularly stark example: from approximately 2.0 million workers in 1979 to approximately 0.9 million in 2024, a decline of roughly 55%. The motor vehicle sector's geographic concentration in Michigan, Ohio, and Indiana drives much of the geographic decomposition Section 4.5 documents.

4.5b Comparison to long-run agricultural decline

The structural transformation we document is the contemporary parallel to the longer-run agricultural transformation that preceded it. US agricultural employment fell from approximately 40% of total employment in 1900 to approximately 12% by 1947 (the start of our nonfarm-payroll sample) and to approximately 1.5% by 2026. The agricultural decline of approximately 38 percentage points over the 1900–2026 period is roughly twice the magnitude of the manufacturing decline of 21 percentage points over the 1947–2026 period.

The comparison is informative for the contemporary policy debate. Agricultural employment declined for substantively similar reasons to the manufacturing decline: capital substitution (mechanization), productivity-driven labor displacement, and the income-elastic demand pattern that shifts consumption toward services as incomes rise. The contemporary US is not the first major economy to navigate a substantial sectoral employment transformation; the agricultural-to-industrial transformation of the early twentieth century is the historical precedent, and the policy lessons—particularly regarding workforce-development programs and geographic adjustment assistance—are directly relevant.

4.6 Cross-margin reconciliation

The patterns documented in Sections 4.1–4.5 are jointly consistent with a structural transformation that has been (i) continuous across all five regime windows, (ii) statistically anchored to a single dominant break date in the late 1970s, (iii) concentrated in a small set of expanding services sectors and a small set of declining manufacturing regions, and (iv) ongoing through the most recent observations.

The single-break test (Section 4.3) and the regime-by-regime analysis (Section 4.1) together suggest that the structural transformation is best characterized as a continuous process with a dominant onset around 1979 rather than a sequence of discrete shocks. The geographic decomposition (Section 4.5) reveals that the continuous national process has been highly heterogeneous at the state level, with consequences for regional inequality that the aggregate analysis obscures.

5. Discussion

This section discusses the implications of the empirical findings across eight topics: the role of the NAICS classification choices in the Information puzzle (5.1), implications for management research (5.2), implications for human capital measurement (5.3), the demographic distribution of opportunity (5.4), the contemporary policy debate (5.5), reproducibility and replication (5.6), limitations (5.7), and the comparison to international structural-transformation experience (5.8).

5.0 Interpretation of the structural transformation

The structural transformation we document admits multiple interpretive frameworks. The income-elastic demand framework (Kuznets, 1957) attributes the transformation to the rising income elasticity of demand for services as households become wealthier. The differential-productivity-growth framework (Baumol, 1967) attributes the transformation to faster productivity growth in manufacturing than in services, with output prices and employment shares moving accordingly. The trade-and-globalization framework (Acemoglu et al., 2016) attributes a portion of the transformation to international trade competition. The task-biased-technological-change framework (Autor et al., 2003; Goos et al., 2014) attributes a portion to differential automation across task categories.

These interpretive frameworks are not mutually exclusive. The empirical pattern we document is consistent with contributions from all four. The relative magnitudes are the subject of ongoing research in the contemporary trade-and-labor literature; the present paper documents the pattern and contributes to the empirical anchor against which the interpretive frameworks can be evaluated.

5.1 The Information puzzle

The apparent decline of Information sector employment (-1.6 pp from 1947–1956 to 2015–2026) deserves specific discussion because it is counterintuitive given the contemporary economy's information-intensive character. The puzzle has two principal resolutions.

First, the FRED Information series uses the NAICS 51 definition, which includes publishing (newspapers, periodicals, books, software publishing), broadcasting, telecommunications, data processing, and information services, but does not include the broader category of information work that is performed across all sectors. Software developers

employed at non-software firms are counted under their employer's sector (Professional Services, Manufacturing, Financial Activities), not under Information.

Second, the publishing and telecommunications subsectors have experienced substantial productivity-driven labor displacement: newspaper publishing employment, for example, has declined by more than 60% since 2000 due to digital substitution and the consolidation of regional papers. The Information sector's NAICS definition captures a substantial productivity story that the share-of-employment metric measures partially and indirectly.

A more comprehensive measure of "information work" would include software developers, data scientists, analysts, and adjacent occupational categories regardless of employing-firm sector. Under such a measure, the share of US employment in information-intensive work has grown substantially over the past four decades, consistent with the contemporary economy's information-intensive character. The FRED Information series should be interpreted as a partial and structurally biased measure of that broader phenomenon.

5.1a The Information sector as a productivity story

The Information sector's decline in share is, on the productivity reading, a measure of productivity gains rather than a measure of decline. Newspaper publishing employment has fallen by more than 60% since 2000 not because the demand for news has declined—news consumption has plausibly risen—but because digital substitution has dramatically reduced the labor required to produce news. The implication is that the apparent "decline" of the Information sector is a productivity gain that the conventional sector-share metric reads as an employment loss.

This pattern generalizes. The agricultural-to-industrial transformation involved a similar pattern: rising agricultural productivity meant that the same agricultural output required progressively fewer workers, even as agricultural output continued to grow. The contemporary parallel is that rising information-services productivity (driven by digital substitution and increasingly by generative-AI substitution) is reducing the labor required to produce information services at fixed quality. The future structural transformation that AI may drive will operate through this productivity-driven mechanism, with implications the structural-transformation literature is well-positioned to characterize.

5.2 Implications for management research

The structural transformation has several implications for firm-level management research that the literature has not fully captured. First, the dominant pool of employment in the contemporary US economy is in sectors—Education and Health Services, Professional and Business Services—that the strategic management literature has not historically prioritized. The substantial body of management research on Manufacturing strategy, lean production, and supply chain management addresses sectors that now account for less than 10% of US employment.

Second, the size of Government employment (approximately 15%) is substantially larger than the management literature's attention to public-sector management practices would suggest. The disjunction between the empirical importance of government employment and the academic literature's coverage is a known gap that the contemporary research agenda is beginning to address.

Third, the rise of Leisure and Hospitality (now 10.7% of nonfarm employment) implies that hospitality management, which has historically been a niche subfield, captures one of the larger employment categories in the contemporary economy.

5.3 Implications for human capital measurement

The sectoral composition implies systematic biases in conventional human capital measures. Education and Health Services workers acquire human capital through credentialed pathways (medical school, nursing school, teacher certification); Professional and Business Services workers acquire human capital through on-the-job learning and a heterogeneous mix of credentials. Conventional human capital measures based on years of schooling capture the first type of human capital well and the second type less well. As the second type has grown relative to the first in employment terms, the measurement gap has grown in aggregate importance.

5.3a The credentialing pathway and labor-market frictions

The contemporary US labor market is characterized by an increasingly important role for credentialed pathways into the dominant employment sectors. Education and Health Services workers in particular face substantial credentialing barriers: physicians complete approximately a decade of post-secondary training; registered nurses complete typically four years of post-secondary training; teachers complete typically five years. The cumulative credentialing investment required to enter these sectors is substantial, with implications for the labor-market frictions facing workers displaced from declining sectors.

A worker displaced from manufacturing employment in 2025 faces, on average, a multi-year retraining commitment to enter Education and Health Services. The mismatch between the timing of the structural transformation (driven by long-run economic forces) and the timing of the individual worker's retraining capacity (constrained by personal and financial resources) is one of the principal sources of the labor-market frictions the literature has documented.

5.4 Demographic distribution of opportunity

The geographic concentration of the manufacturing decline has corresponded to a demographic concentration of adverse outcomes. Case and Deaton (2020) document the "deaths of despair" pattern—rising mortality from suicide, drug overdose, and alcohol-related causes—concentrated among non-college-educated white workers in the demographic groups most exposed to the manufacturing decline. The geographic overlap between the eight states

identified in Section 4.5 and the regions with the most elevated deaths-of-despair rates is substantial.

The implication is that the structural transformation is not socially neutral: it has produced winners (workers in expanding service sectors, residents of growing metropolitan areas, college-educated workers in professional services) and losers (workers in declining manufacturing sectors, residents of Rust Belt regions, non-college-educated workers without service-sector skills). The political-economy literature on the contemporary US has emphasized this distributional asymmetry; the empirical patterns documented in the present paper provide one quantitative anchor for that literature.

5.5 Contemporary policy debate

The empirical findings have direct relevance to the contemporary policy debate over manufacturing revival, place-based development, and trade policy. The localization of the dominant break to 1979 (Section 4.3) implies that the contemporary policy debate over China trade is engaging only the tail end of a four-decade transformation, with much of the manufacturing decline already realized before the 2001 China WTO accession. Trade policy can in principle affect the marginal decline of manufacturing employment from current levels, but the cumulative trajectory is overwhelmingly driven by forces that pre-date the contemporary trade debate.

Bartik (2020) provides the contemporary review of place-based policy literature and concludes that targeted policies have mixed empirical track records. The eight states identified in Section 4.5 have been the targets of substantial place-based policy interventions over the past several decades; the persistence of their employment underperformance suggests that the policy interventions have had at best limited offsetting effects.

5.6 Reproducibility and replication

The analysis is exactly reproducible from FRED public data. The replication code computes the regime-by-regime sector shares, applies the sup-F structural-break test, and aggregates the BEA state-level data to the eight-state decomposition. The code is deposited at the journal's online repository.

5.6a Connection to AI and the prospective structural transformation

The structural transformation we document is from manufacturing to services. The contemporary technology cycle—the diffusion of generative AI—has potential implications for the next structural transformation. Acemoglu (2024) provides the contemporary framework for thinking about which service-sector occupations are most exposed to AI substitution, and the answer (cognitive professional services, including some categories within Professional and Business Services and Information sectors) is precisely the set of sectors that have grown most rapidly over the past two decades.

A prospective structural transformation in which AI substitutes for tasks within Profes-

sional and Business Services and Information sectors would partially reverse the trajectory we document. Whether such a reversal occurs—and the magnitude and pace if it does—is a substantive empirical question that the contemporary AI-labor literature is beginning to address. The structural-transformation framework we apply provides one approach to characterizing the prospective change as it unfolds.

5.7 Limitations

The analysis uses nonfarm payroll employment, which excludes agricultural employment, self-employed workers, and unincorporated independent contractors. The exclusion of self-employed workers is particularly consequential for the gig economy and platform-mediated work; the inclusion of these workers, were the data available, would likely show a larger Information-related employment category than the NAICS-defined Information sector captures. The sectoral classifications are themselves products of historical choices that may not optimally capture contemporary economic activity; the NAICS classification is currently under revision (NAICS 2027) to address some of these limitations.

The sup-F single-break test assumes a single dominant change; the manufacturing-share series may exhibit multiple substantive breaks that the test does not jointly characterize. The Bai-Perron multiple-break test (Section 4.3) provides one approach to this concern; a richer time-varying-parameter analysis would be a natural extension.

5.8 International comparison

The US structural transformation is one instance of a broader pattern that has unfolded across advanced economies. Herrendorf et al. (2014) document the cross-country pattern: every advanced economy has experienced a manufacturing share decline of comparable magnitude, with the specific timing and pace varying by country. The UK manufacturing share has fallen even more sharply than the US (from approximately 35% in 1970 to approximately 8% in 2025); Germany's manufacturing share has held up better (from approximately 30% to approximately 20%), reflecting the country's continued export specialization in manufactured goods. Japan's pattern resembles the US.

A cross-country update of the structural-transformation literature through 2026 would provide useful context for the US pattern. We have not pursued the cross-country analysis but flag it as a natural extension.

6. Conclusion

This paper has documented, using FRED monthly employment series over 1947–2026, the structural transformation of the US nonfarm payroll workforce from manufacturing to services. The dominant pattern is the decline of Manufacturing as a share of total employment, from 28.7% in the postwar period to 7.9% in 2026, balanced by the rise of three service-sector categories: Education and Health Services (+11.1 pp), Professional and

Business Services (+7.3 pp), and Leisure and Hospitality (+3.9 pp). The sup-F structural-break test localizes the dominant single break in the manufacturing-share series to 1979Q2, well before the better-known 1990s globalization episode. The geographic distribution of the transformation is concentrated in a Rust Belt corridor of eight states that account for approximately 60% of the cumulative national manufacturing job loss.

A specific implication for the contemporary US economic policy debate deserves attention. The findings document that the manufacturing-to-services transformation is largely complete: manufacturing's share of employment is now in the 7–8% range, comparable to or below the contemporary shares in other advanced economies, and the manufacturing employment level has stabilized over the past decade. The policy debate over manufacturing revival is therefore engaging a target whose feasibility is constrained by the long-run structural trajectory we document. The historical precedent of the agricultural-to-industrial transformation suggests that policy interventions can affect the marginal trajectory but cannot reverse the underlying structural force.

6.1 What this paper provided

The empirical contribution of the paper is fivefold:

- Updated quantitative documentation of the US sectoral employment composition through 2026 across ten major sector categories and five historically motivated regime windows.
- Formal sup-F structural-break inference on the manufacturing-share series, localizing the dominant single break to 1979Q2 with a 90% confidence interval of [1978Q4, 1979Q4].
- Documentation of the geographic concentration of the manufacturing decline in eight Rust Belt and Mid-Atlantic states that account for approximately 60% of the cumulative national job loss.
- Empirical resolution of the "Information puzzle"—the apparent decline of the FRED Information sector despite the contemporary economy's information-intensive character—through analysis of the NAICS classification choices.
- Connection of the empirical patterns to the contemporary debates on management research priorities, human capital measurement, the demographic distribution of opportunity, and the place-based policy literature.

A final substantive observation deserves emphasis. The structural transformation we document is the empirical manifestation of a long-run economic process whose direction is broadly understood but whose distributional consequences are politically contested. The

contemporary US debates over manufacturing revival, trade policy, place-based development, and labor-market adjustment are engaging the distributional consequences of a transformation whose underlying drivers are deep and persistent. The empirical record we present is not a prescription for policy; it is a quantitative anchor against which policy proposals can be evaluated for their consistency with the empirical trajectory. Proposals that promise to restore the manufacturing employment share to postwar levels (28.7%) are inconsistent with the structural forces we document; proposals that target the geographic and demographic distribution of the transformation's consequences are operating within the structural envelope.

6.2 Extensions

Several extensions warrant further development.

International comparison. A cross-country update of the structural-transformation literature through 2026 using OECD's International Sectoral Database would provide useful comparative context.

Firm-level analysis. How firms in declining sectors (Manufacturing) and growing sectors (Education and Health Services) have differed in their organizational and strategic adaptations is an obvious next research direction.

Local-area decomposition. The state-level analysis can be refined to the metropolitan-statistical-area (MSA) level using BLS QCEW data. The MSA-level concentration of the decline is likely even sharper than the state-level concentration; the within-state variation across MSAs (*e.g.*, Pittsburgh vs. Philadelphia within Pennsylvania) is itself informative.

Sub-period structural-break analysis. The Bai-Perron multiple-break test identified candidate breaks at 1997Q4 and 2008Q4 in addition to the dominant 1979Q2 break. A formal analysis of whether these candidate breaks correspond to substantive regime changes, or whether they reflect within-trajectory noise around a continuous trend, would refine the empirical characterization.

Connection to wage and occupational composition. The sectoral composition analysis can be extended to the wage and occupational composition within each sector. The implication is that the documented sector-share changes mask substantial within-sector heterogeneity in worker outcomes.

Demographic decomposition. The differential impact of the structural transformation on demographic subgroups (by race, gender, age, education level) is an obvious next research direction that the contemporary microeconomic-labor literature is well-positioned to engage.

Wage and income decomposition. The sector-share analysis treats workers as interchangeable within sectors. A wage-and-income decomposition that tracks the wage trajectories of workers within each sector over the regime windows would identify whether the rising sectors (Education and Health Services, Professional and Business Services) have absorbed the displaced manufacturing workers at comparable wages or at lower wages. The preliminary

evidence in the literature suggests substantial wage discounting for workers transitioning from manufacturing to services; a formal documentation of the pattern is a natural extension.

Productivity-by-sector decomposition. The structural transformation involves not only employment-share changes but also productivity-share changes. A version of the analysis that examines the sector-by-sector productivity contribution to aggregate productivity would identify the aggregate productivity consequences of the structural transformation. The preliminary evidence in the productivity-decomposition literature (Syverson, 2017) suggests that sectoral reallocation has been a substantial contributor to the aggregate productivity slowdown, with the reallocation from high-productivity manufacturing to lower-productivity services exerting a measured drag on aggregate growth.

Long-horizon update. The most consequential extension is to wait. The post-2022 period contains the post-COVID rebound and the early-stage AI-diffusion period, neither of which has reached steady state. Future years of data will resolve whether the contemporary sectoral composition is the new long-run equilibrium or a transient configuration that will continue to evolve. The infrastructure we develop supports the immediate updating of the analysis as additional data become available.

6.3 A note on methodological discipline

The empirical patterns documented in this paper are descriptive. The contemporary US labor market is sufficiently complex that descriptive findings of the magnitude reported here demand careful interpretive engagement, not simple causal attribution. We have aspired to report the magnitudes faithfully, to identify the alternative explanations that the descriptive evidence cannot adjudicate, and to specify the research designs that would discriminate among them.

The structural transformation we document is a continuous process that has unfolded over eight decades. The contemporary policy debates—over manufacturing revival, place-based development, trade policy, and labor-market adjustment—are engaging only the tail end of this transformation, and the empirical record we present provides the long-run context against which the contemporary debates can be evaluated.

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