Tale of Two Labor Markets: Structural Determinants of Cyclical Unemployment Across the Urban-Rural Divide

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Abstract

This project investigates whether urban and rural labor markets exhibit structurally distinct cyclical unemployment dynamics and to what extent these differences are attributable to observable characteristics. Using county-level unemployment data from 1990–2025, I will apply time-varying parameter decompositions to isolate cyclical components and then employ Blinder–Oaxaca and Recentered Influence Function (RIF) decompositions to compare distributions across metropolitan and nonmetropolitan counties. Unlike mean-based approaches, this framework captures heterogeneity across quantiles, revealing whether rural areas are disproportionately vulnerable during severe downturns. These findings have direct implications for the design of countercyclical stabilization policies.

Background

Unemployment dynamics are central to macroeconomic research, yet aggregate statistics conceal substantial spatial heterogeneity. Metropolitan and nonmetropolitan labor markets often respond quite differently to macroeconomic shocks: rural areas tend to experience muted job losses during downturns but slower recoveries, while urban areas display sharper volatility and faster rebounds (Thiede and Monnat, 2016). These disparities may reflect differences in industrial composition, demographic structure, human capital endowments, or reliance on transfer programs. However, most empirical work has relied on mean-based comparisons, which obscure the distributional nature of these dynamics. If rural counties are disproportionately represented in the upper tail of cyclical unemployment during recessions, the welfare consequences are more severe than average differences alone would suggest.

Recent methodological advances make it possible to address this gap. The Oaxaca–Blinder decomposition (Blinder, 1973; Oaxaca, 1973) has long been used to partition group differences into "explained" and "unexplained" components, but its application has been limited to mean outcomes. The Recentered Influence Function (RIF) regression framework (Firpo, Fortin, and Lemieux, 2009) extends this logic to quantiles, variances, and other distributional statistics. Applying these tools to cyclical unemployment across the urban–rural divide provides a novel lens on spatial inequality in labor market resilience, offering both methodological innovation and direct policy relevance.

Intellectual Merit

This project proceeds in two stages. First, I will decompose county-level unemployment rates into trend and cyclical components using the time-varying parameter approach of Stock and Watson (2016). I will implement this model using Bayesian methods with conjugate priors and estimate it via Markov Chain Monte Carlo sampling. This approach outperforms traditional filtering methods by allowing the volatility of trend and cyclical shocks to evolve over time, particularly important for capturing the changing dynamics through recessions including the 2008 financial crisis and COVID-19 pandemic.

Working with county-level unemployment data from 1990-2025 presents several econometric challenges. Unemployment and related covariates often exhibit persistence and potential nonstationarity. Moreover, the dependent variable of interest—the cyclical component of unemployment—is unitless, which necessitates careful construction of regressors to ensure comparability. By expressing all explanatory variables as rates (e.g., employment-to-population ratios, firm entry rates, transfer payments as a share of income), the analysis maintains internal consistency and avoids dimensional mismatches.

Second, I will analyze differences in cyclical unemployment between metropolitan and nonmetropolitan counties using decomposition methods. For the RIF decomposition approach, I will first estimate quantile-specific counterfactual distributions using $\mathrm{RIF}(c_{i,t}, Q_\tau) = \mathbf{X}_{i,t}^\top \beta_{\mathrm{nonmetro},\tau}$, where

$\mathrm{RIF}(c_{i,t}; Q_\tau)$ is the recentered influence function for the quantile Q_τ of cyclical unemployment, $\mathbf{X}_{i,t}$ represents the vector of covariates including industrial composition shares, demographic characteristics, and transfer payment rates for county i and month t, and $\beta_{\mathrm{nonmetro},\tau}$ are the estimated coefficients for nonmetropolitan counties at quantile τ.

For each quantile Q_τ, the total difference in cyclical unemployment can be decomposed as $Q_\tau(c_{\mathrm{metro}}) - Q_\tau(c_{\mathrm{nonmetro}}) = (\bar{X}_{\mathrm{metro}} - \bar{X}_{\mathrm{nonmetro}})^\top \beta_{\mathrm{nonmetro},\tau} + \bar{X}_{\mathrm{metro}}^\top (\beta_{\mathrm{metro},\tau} - \beta_{\mathrm{nonmetro},\tau})$, where the first term represents the "explained" portion due to differences in observable characteristics, and the second term represents the "unexplained" portion attributable to differences in returns to those characteristics. This specification allows me to investigate whether the contributions of industrial mix, demographics, and transfer payments vary across quantiles of the cyclical unemployment distribution, providing insight into whether these factors matter differently during mild fluctuations versus severe downturns. For inference, decomposition components will rely on bootstrap methods and the delta method, ensuring valid standard errors despite the multi-step estimation process. For robustness, I will test alternative specifications for both the time-series decomposition and the distributional analysis.

Feasibility of Research

My current position at the Federal Reserve Board has uniquely prepared me to execute this project. I have been working directly on robustifying state-space models, giving me practical expertise with the Stock and Watson (2016) approach that forms the methodological foundation of this proposal. This hands-on experience includes implementation of Kalman filtering techniques and handling the computational challenges of estimating unobserved component models with stochastic volatility across thousands of county-level time series. Additionally, I have already developed custom code for inference in Oaxaca-Blinder decompositions since existing statistical packages do not provide the flexibility needed for this application. This required implementing delta method calculations for standard errors and designing bootstrap procedures to properly account for the multi-stage estimation process.

Broader Impacts

This research addresses fundamental questions of spatial inequality in economic resilience with direct implications for policy design. If rural and urban labor markets exhibit structurally different responses to economic cycles, then one-size-fits-all countercyclical policies may be ineffective. Particularly, as regional economic divergence has become a significant social and political concern, this research provides an empirical foundation for addressing spatial inequality. By systematically documenting how and why economic shocks affect communities differently across the urban-rural continuum, this work contributes to the design of place-based policies that can promote more balanced, inclusive economic growth. This approach represents a significant advance over current practice, where spatial dimensions are often secondary considerations in macroeconomic policy design.

References

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