Research Statement

Joy Bayan

Research Statement

My research examines how heterogeneity shapes inflation dynamics. Macroeconomic models often rely on aggregate measures such as average inflation expectations, national inflation rates, and representative households. While these summaries are useful, they can conceal substantial variation in the beliefs households hold, the economic conditions they face, and the prices they pay. My work studies when this heterogeneity matters for macroeconomic outcomes and how incorporating it changes our understanding of inflation. Across my research, a common theme emerges: aggregate measures frequently mask economically important information contained in distributions. Whether studying inflation expectations, regional inflation dynamics, or household-specific inflation experiences, I investigate how variation beneath aggregate statistics influences inflation formation, transmission, and welfare. Combining household surveys, regional data, and transaction-level records, I seek to better understand how macroeconomic outcomes emerge from diverse household experiences.

Distributional Information and Inflation Dynamics

My job-market paper, *When the Mean Is Not Enough: The Distribution of Inflation Expectations and Inflation Dynamics*, asks whether average inflation expectations adequately summarize the role of household beliefs in inflation. Empirical Phillips Curve models typically represent expectations using their mean. However, two periods with similar average expectations may differ substantially in the proportion of households expecting very high inflation or outright price declines. If households respond differently to economic conditions, these distributional differences may contain information that aggregate expectation measures overlook. Using individual responses from the University of Michigan Survey of Consumers, I estimate monthly distributions of one-year-ahead inflation expectations and apply functional principal component analysis (FPCA) to characterize their evolution over time. Rather than treating expectations solely through their average, I examine movements of the entire distribution, including changes in location, dispersion, and tail behavior. This approach allows me to distinguish broad-based shifts in expectations from changes concentrated among subsets of households. I find that distributional measures contain substantial information beyond average expectations. Once distributional factors are included in Phillips Curve specifications, they remain jointly significant while the explanatory role of the mean expectation declines considerably. The evolution of expectations also differs across major macroeconomic episodes. During the COVID inflation surge, expectations initially adjusted through growth in the upper tail before shifting more broadly across households. During the Great Recession, a leftward movement of expectations preceded an expansion of the lower tail. These patterns suggest that inflation expectations evolve through heterogeneous responses that aggregate measures cannot fully capture. More broadly, the paper contributes to a growing literature emphasizing heterogeneity in macroeconomics. It demonstrates that the distribution of beliefs, rather than simply their average, contains information relevant to inflation dynamics. The results also suggest that policymakers may learn different things from changes concentrated among households in the tails of the distribution than from broad-based shifts in expectations.

Regional and Household Heterogeneity in Inflation

A second strand of my research examines how aggregate inflation relationships conceal important variation across regions and households. My second dissertation project studies the flattening of the regional U.S. Phillips Curve. Using quarterly data for 33 states and the District of Columbia from 1990 to 2017, I document a substantial weakening of the relationship between unemployment and inflation after 2001. Excluding shelter inflation, the estimated Phillips Curve slope declines from approximately -0.163 before 2002 to -0.039 afterward. The largest change occurs in nontradable inflation. Motivated by open-economy New Keynesian models, I examine whether differences in regional trade exposure help explain this change. While national evidence points to a flatter Phillips Curve, regional data reveal substantial heterogeneity in inflation dynamics across local economies. By distinguishing domestic inflation dynamics from imported-price effects, this work seeks to clarify the mechanisms through which globalization may have altered the inflation-unemployment relationship. My third dissertation project, *When the Poor Pay More for Groceries: Post-COVID Online Retail Transformation*, examines how inflation affects households differently. This project is joint work with Xudong (Sean) An of the Federal Reserve Bank of Philadelphia and Rodney Ramcharan of the University of Southern California. Using approximately 100 million grocery transactions, we construct income-specific price indices to measure inflation experienced by households across the income distribution. Preliminary findings indicate that low-income households experienced higher grocery inflation following the pandemic, particularly for fresh produce beginning in 2022. We also find that increased online shopping reduced an important source of savings for lower-income households. Ongoing work decomposes these differences into the contributions of item prices, product choices, retailer selection, and shopping channels. Aggregate inflation measures describe movements in average prices but provide limited information about how inflation affects purchasing power across households. This project highlights the distributional consequences of inflation and explores how changes in retail markets contribute to unequal inflation experiences.

Future Research

My future research agenda builds directly on these themes and focuses on two related questions: what generates heterogeneity in inflation expectations, and how technological change alters price-setting behavior. The first direction examines the formation of inflation expectations. A current project studies gasoline price salience and investigates whether frequently observed prices influence the center of the expectations distribution, its tails, or both. This work extends my job-market paper by moving beyond documenting distributional movements to identifying the household experiences that generate them. The second direction studies how retail technologies shape inflation outcomes. Building on my work on grocery inflation, I plan to examine the adoption of digital shelf labels and their effects on the frequency and magnitude of price adjustments. Combining information on technology adoption with transaction-level price data will allow me to study how changes in retailers' pricing technology influence both inflation dynamics and consumer welfare.

My experiences at the Federal Reserve Banks of Philadelphia and San Francisco have reinforced the importance of careful measurement and policy-relevant empirical research. Across my work, I seek to understand how inflation emerges from the diverse experiences of households and regions rather than from representative agents alone. My long-term goal is to explain how heterogeneity in beliefs, economic conditions, and consumer experiences shapes inflation dynamics and determines who bears the costs of inflation.