I am an applied macroeconomist with research interests that intersect with finance, labor, and international economics. As of July 2021, my articles have garnered more than 3000 Google Scholar citations and I am ranked by RePEc in the top 50 authors based on publications in the past ten years.

Methodologically, my work combines careful attention to identification of causality, measurement, and economic theory. Much of my work uses micro or regional data and cross-sectional variation to generate causal estimates and economic theory to link these estimates to their aggregate counterparts and to consider counterfactuals. Thematically, I have studied questions motivated by the major macroeconomic developments of the past two decades, including the 2000s housing cycle in the United States, the role of the financial sector and other forces in the Great Recession, the policy response to the Great Recession, the consequences of stock market booms and busts, the Greek crisis, the 2016 demonetization in India, and COVID.

In what follows I summarize all of my published and forthcoming articles since 2012, grouped into three topics: "The Financial Sector and the Real Economy," "Regional Spending Shocks and Cross-Sectional Aggregation," and "Unemployment and Labor Markets." I conclude by discussing two current working papers.

The Financial Sector and the Real Economy

Does bank health matter to aggregate business cycles? How do shocks to the financial sector transmit to the macroeconomy? I take up these and related questions in a series of articles.

The Employment Effects of Credit Market Disruptions: Firm-level Evidence from the 2008-09 Financial Crisis (Chodorow-Reich, 2014b, ***Quarterly Journal of Economics***, editor's choice) establishes the existence of a firm credit channel during the Great Recession by showing that nonfinancial firms that had borrowed from less healthy lenders reduced employment by more. To this end, I merge the DealScan syndicated loan database, which contains the borrowing history of firms that have accessed the syndicated loan market, with confidential employment data from the Bureau of Labor Statistics Longitudinal Database. I first show that bank lending relationships are sticky, making it plausible that a firm with a pre-crisis relationship with an *ex post* less healthy lender could not frictionlessly switch to a healthier lender during the crisis. I then exploit the origins of the 2008-09 crisis in areas outside of corporate lending to construct three measures of crisis exposure that can serve as excluded instruments to identify the impact of a decline in bank lending. Comparing employment outcomes at firms that had borrowed before the crisis from relatively healthy financial institutions with otherwise similar firms that had borrowed from lenders more adversely affected during the crisis, those with pre-crisis relationships with less healthy lenders had a lower likelihood of obtaining a loan following the Lehman bankruptcy, paid a higher interest rate if they did borrow, and reduced employment by more compared to pre-crisis clients of healthier lenders. The employment effects scale up to a potentially large share of the total decline in employment in 2008-09. Finally, the article presents a theoretical framework for relating firm-level effects to aggregate outcomes that anticipates much subsequent work on the micro-to-macro problem in bank lending (see e.g. Herreño, 2021).

An important unresolved question in Chodorow-Reich (2014b) is why distress in the financial sector transmitted so rapidly to non-financial firms. At the start of the financial panic in 2008, only 10% of bank loans to mid-size and large firms had remaining maturity of less than one year and the typical firm did not face the prospect of a maturing bank loan until 2011. Why did shocks to lenders affect their existing corporate borrowers despite the prevalence of long-term credit? In **The Loan Covenant Channel: How Bank Health Transmits to the**

Real Economy (Chodorow-Reich and Falato, Forthcoming, ***Journal of Finance***), Antonio Falato and I propose loan covenant violations as the crucial transmission mechanism. We focus on cashflow-based covenants, wherein a decline in earnings below a threshold multiple of debt or interest payments triggers a violation that allows lenders to force a renegotiation of loan terms or to accelerate repayment of otherwise long-term credit. Using a new supervisory data set of covenant compliance in the syndicated market and the lender health measures developed in Chodorow-Reich (2014b), we find that one-third of loans breached a covenant during the 2008-09 period and that lenders in worse health were more likely to force a reduction in loan commitment following a violation. This mechanism is quantitatively important and can account for the majority of the cross-sectional variation in credit supply during the 2008-09 crisis.

While Chodorow-Reich and Falato (Forthcoming) shows how credit to large firms is only partially committed due to covenants, smaller firms' ability to access bank credit in times of distress may be even more tenuous. Yet, almost all research on bank liquidity to U.S. firms uses data sets such as DealScan that contain very few small and medium enterprises. In **Bank Liquidity Provision Across the Firm Size Distribution** (Chodorow-Reich et al., Forthcoming, ***Journal of Financial Economics***), Olivier Darmouni, Stephan Luck, Matthew Plosser and I use supervisory loan-level data containing more than 50,000 small and medium enterprises and 60% of total corporate bank lending to document several differences in the terms (shorter maturity, more collateral, etc.) on credit lines to small relative to large borrowers. These terms provide lenders additional discretion in responding to a drawdown request by small firms. We then show that only large firms drew on their credit lines at the start of the COVID pandemic, illustrating the macroeconomic significance of the structuring of loan terms and that credit constraints can arise even when lenders have sufficient funds.

In **Asset Insulators** (Chodorow-Reich et al., 2021a, ***Review of Financial Studies***), Andra Ghent, Valentin Haddad and I study shocks to the financial sector itself. In theories of financial distress, a decline in asset prices additionally reduces the health of financial institutions, yielding a more than one-to-one effect and potentially starting an adverse fire sale spiral. We explore an alternative view, which we call asset insulation, wherein financial institutions with stable, long-term liabilities can withstand transitory fluctuations in the value of their asset holdings. We present direct evidence of asset insulation in the form of the passthrough from asset holdings to equity, using a data set of 11.5 million corporate bond returns merged with security-level data on the asset positions and equity returns of publicly-traded life insurance companies. Insurers' equity responds little to the value of their securities in normal times, but becomes much more sensitive during the 2008-09 crisis when solvency concerns threatened their ability to maintain a stable balance sheet. We calculate that the ability to insulate prevented the destruction of nearly $50 billion of market equity in the life insurance sector at the peak of the 2008-09 crisis.

The importance of balance sheet effects during the 2008-09 period can also explain why, contrary to much "market wisdom" that low interest rates would harm life insurance companies due to their long term liabilities, insurers' stock valuations rose substantially around announcements of quantitative easing and forward guidance in the 2008-09 period, as I document in **Effects of Unconventional Monetary Policy on Financial Institutions** (Chodorow-Reich, 2014a, ***Brookings Papers in Economic Activity***). The article provides a theoretical framework for assessing the impact of interest rates on the riskiness and risk-taking of financial institutions and also studies in depth money market funds and pension funds and how these institutions responded to the extraordinary interest rate environment in the post-crisis period.

Regional Spending Shocks and Cross-Sectional Aggregation

Another strand of my research concerns the use of regional data to study macroeconomic questions. In many contexts, regional data offer plausible natural experiments and substantial variation in macroeconomic policies or shocks, yet regional responses to regional shocks may differ from national responses to national shocks.

An early contribution in this area concerns the magnitude of fiscal spending multipliers. When, in 2009, the United States implemented the American Recovery and Reinvestment Act (ARRA) as a stimulus program, forecasts of the potential effects varied widely, reflecting the absence of consensus among macroeconomists around the government spending multiplier. However, the passing of the ARRA as a response to a national economy already deteriorating due to the housing bust and financial crisis makes *ex post* evaluation at a national level impossible. In **Does State Fiscal Relief During Recessions Increase Employment? Evidence from the American Recovery and Reinvestment Act** (Chodorow-Reich et al., 2012, ***American Economic Journal: Economic Policy***, best paper prize), Laura Feiveson, Zachary Liscow, William Woolston and I study the impact of the ARRA using cross-state variation in the generosity of the largest single spending program in the ARRA, the $88 billion of aid to state governments transmitted through an increase in the federal Medicaid match rate. We create a simulated instrument for ARRA transfers based on pre-recession Medicaid spending and find substantial employment effects for states which received larger per capita transfers.

Many subsequent papers adopt a similar cross-sectional research design to study the effects of fiscal policy. A complementary theoretical literature developed to relate these cross-sectional multipliers to an aggregate multiplier (Nakamura and Steinsson, 2014; Farhi and Werning, 2016). In **Geographic Cross-Sectional Fiscal Spending Multipliers: What Have We Learned?** (Chodorow-Reich, 2019, ***American Economic Journal: Economic Policy***), I take stock of both of these literatures. Drawing on the theory, I characterize a novel lower bound result, wherein the typical empirical cross-sectional multiplier study provides a rough lower bound for a particular, policy-relevant type of national multiplier, the closed economy, no-monetary-policy-response, deficit-financed multiplier. The lower bound reflects the high openness of local regions relative to the country as a whole, while the "rough" accounts for the small effects of outside financing common in cross-sectional studies such as the federally-financed ARRA. Such a bounding argument sidesteps the difficulty in the prior literature that different modeling or parameter choices could result in widely different translations of local to national multipliers. I also provide a practical mapping between the local employment multipliers often estimated in the empirical literature and the local output multipliers more directly of interest to macroeoconomists. I then review empirical studies and find a cross-study mean cross-sectional output multiplier of about 1.8, implying an appropriately-defined national multiplier at the upper end of ranges suggested by earlier time series evidence.

The insight from the study of fiscal policy that regional variation can help to answer traditionally macroeconomic questions has portability to other settings. In **Cash and the Economy: Evidence from India's Demonetization** (Chodorow-Reich et al., 2020, ***Quarterly Journal of Economics***), Gita Gopinath, Prachi Mishra, Abhinav Naraynan and I use it to analyze a unique episode in the history of monetary economics, the 2016 Indian "demonetization." This policy made 86% of cash in circulation illegal tender overnight, with new notes gradually introduced over the next several months. We use confidential currency chest data from the Reserve Bank of India to construct measures of the cash shortage in each of 550 districts. We combine these cash shocks with new measures of outcomes at the district level, including nightlights, employment as

measured in a new household survey, and non-cash payments using E-wallet and credit or debit cards. Districts experiencing more severe demonetization had relative reductions in economic activity, faster adoption of alternative payment technologies, and lower bank credit growth. We motivate these outcomes using a a multi-area cash-in-advance model of demonetization. Applying a lower bound in the model similar to that in Chodorow-Reich (2019), the cross-sectional responses cumulate to a contraction in aggregate employment and night lights–based output of more than 2 percentage points in 2016Q4. We conclude that the demonetization episode rejects monetary neutrality in the context of a large-scale natural experiment, something that is still rare in the vast literature on the effects of monetary policy.

Stock Market Wealth and the Real Economy: A Local Labor Market Approach (Chodorow-Reich et al., 2021d, ***American Economic Review***) provides another example of the use of regional data to answer a macroeconomic question. In this article, Plamen Nenov, Alp Simsek, and I construct county-level measures of stock market wealth by capitalizing dividends reported on federal tax returns, taking care to adjust appropriately for non-taxable stock market wealth and heterogeneous portfolio dividend yields. Next, we present evidence that local employment and payroll rise faster in high wealth counties following an increase in national stock prices, and that these responses concentrate in non-tradable industries. As stock market wealth is not randomly assigned across counties, our baseline responses control for the interaction of stock market wealth with returns on other forms of wealth such as housing or bonds and we show extensive robustness to controls, specification, and sample. We then develop a heterogeneous area two-agent New Keynesian model that provides a structural interpretation of the local labor market effects. The model delineates a simple relationship between the local payroll response in non-tradable industries and the household-level marginal propensity to consume (MPC) out of stock wealth that requires calibration of only the labor share of income and the local government spending multiplier. Combining the empirical non-tradable payroll response with the evidence on local government spending multipliers reviewed in Chodorow-Reich (2019), this relationship implies an annual MPC of 3.2 cents per dollar of stock wealth. At the aggregate level, we use the model and a lower bound argument to find that our locally estimated responses imply that annual aggregate payroll increases by at least 1.7 percent and hours by at least 0.7 percent following a standard deviation increase in the stock market, unless countered by monetary policy.

Regional Data in Macroeconomics: Some Advice for Practitioners (Chodorow-Reich, 2020, ***Journal of Economic Dynamics and Control***) provides a general discussion of the aggregation of regional responses to shocks in the context of a potential outcomes framework that formalizes the notion of spillovers and the difference between typical cross-region estimates and the national impact of a policy. The article also discusses many practical econometric pitfalls, including weak instruments, weighting, and the importance of violations of the no-interference condition to the estimation of local responses, and presents Monte Carlo evidence to assess the sensitivity of ARRA results reported in Chodorow-Reich (2019) to these issues.

Unemployment and Labor Markets

A third strand of my research focuses on unemployment and labor markets, including classic debates concerning the sources of unemployment fluctuations, the macroeconomic effects of unemployment insurance, and how structural reallocation impacts business cycles.

In recent years, much attention has centered on how to make equilibrium models of unemployment consistent with empirical levels of unemployment volatility. A large and fixed opportunity cost of employment offers one possible answer (Hagedorn and Manovskii, 2008). In **The**

Cyclicality of the Opportunity Cost of Employment (Chodorow-Reich and Karabarbounis, 2016, ***Journal of Political Economy***) Loukas Karabarbounis and I construct a theoretically-motivated time series of the opportunity cost. This exercise combines administrative and survey data on how government benefits and taxes vary with unemployment status over the cycle, eligibility and take-up of benefits, consumption by employment status, marginal tax rates, and preference parameters governing consumption-leisure complementarity, the intertemporal elasticity of substitution, the Frisch labor supply elasticity, and the disutility of taking up benefits. Our opportunity cost series is robustly procyclical and volatile over the business cycle. We show analytically that in the standard search-and-matching framework a perfectly procyclical opportunity cost makes the level of the series irrelevant to unemployment fluctuations. Quantitatively, across several models the estimated cyclicality rejects theories of unemployment volatility in which wage rigidity results from a fixed opportunity cost. More constructively, it motivates research into other potential sources of unemployment fluctuations (see e.g. Hall, 2017; Kehoe et al., Forthcoming).

In **The Macro Effects of Unemployment Benefit Extensions: A Measurement Error Approach** (Chodorow-Reich et al., 2019, ***Quarterly Journal of Economics***), John Coglianese, Loukas Karabarbounis, and I investigate the role of extensions of eligibility for unemployment insurance (UI) in explaining the high and persistent unemployment in the aftermath of the Great Recession. Quantifying the effects of UI benefit extensions on macroeconomic outcomes is challenging because federal law links actual benefit extensions in a state directly to state-level macroeconomic conditions. We implement a novel empirical design that exploits measurement error in the real-time data used to determine a state's eligibility for benefit extensions. Using only the component of cross-state variation in benefit extensions coming from measurement error, we find that while extensions meaningfully increase the share of the unemployed receiving benefits, they have a small effect on state-level macroeconomic outcomes such as employment, unemployment, labor force participation, and vacancies. As in my research on regional spending shocks, care must be taken to infer aggregate responses from regional outcomes. We use the state-level responses to discriminate across search-and-matching models of the labor market. Our estimates imply that the increase in the duration of benefits during the Great Recession increased the unemployment rate by at most 0.3 percentage point at their peak. This insensitivity accords well with the conclusion of Chodorow-Reich and Karabarbounis (2016) that historically the increase in government benefits per unemployed in recessions cannot explain unemployment volatility.

Secular Labor Reallocation and Business Cycles (Chodorow-Reich and Wieland, 2020, ***Journal of Political Economy***), joint with Johannes Wieland, studies another widely-discussed potential determinant of the high unemployment around the Great Recession: industry reallocation and sectoral mismatch. We define secular industry reallocation as the change in an economy's allocation of inputs in response to persistent, idiosyncratic sectoral shocks. We design a "double-Bartik" methodology to identify the contribution of secular reallocation to unemployment using variation in industry composition across broadly defined local labor markets. Intuitively, we compare areas with similar predicted employment growth given their industry structure and national employment growth but that vary in the amount of reallocation predicted to occur across industries. Using confidential administrative data on employment by area and industry covering the period 1979-2016, we document that secular reallocation results in higher unemployment in a local area if it occurs during a national recession, but not if it occurs during a national expansion. In a technical contribution forced on us by a change in establishment reporting during the 1991 recession, the paper derives standard errors for these responses that hold in two-sample instrumental variable settings where observations overlap across samples, which have been used in subsequent work (see e.g. Allcott et al., 2019; Hazell et al., Forthcoming). We interpret the results

using a model of frictional labor markets and show that the model can reproduce the empirical results subject to inclusion of two key, empirically plausible frictions: imperfect mobility across industries, and downward nominal wage rigidity. We also show that reallocation forces were not much higher during the Great Recession than in previous recessions, so that the amplification to unemployment coming from reallocation was not especially high during that period.

Finally, in **Projecting Unemployment Durations: A Factor-Flows Simulation Approach With Application to the COVID-19 Recession** (Chodorow-Reich and Coglianese, 2021, ***Journal of Public Economics***) John Coglianese and I develop a method for forecasting unemployment durations. Our method has three components: (i) estimate individual transition hazards across labor market states, with each hazard depending on an aggregate component as well as an individual's labor force history; (ii) relate the aggregate components to the overall unemployment rate using a factor model; (iii) combine the individual duration dependence, factor structure, and an auxiliary forecast of the unemployment rate to simulate a panel of individual labor force histories. We apply this method to forecasts of the overall unemployment rate during the COVID recession and generate predictions of key interest to policy makers such as potential unemployment insurance recipients by duration.

Selected Work In Progress

I briefly describe two completed working papers. **The Macroeconomics of the Greek Depression** (Chodorow-Reich et al., 2021c) investigates quantitatively the forces behind the boom, collapse, and (non) recovery of the Greek economy over the period 1998-2017. The decade-long collapse in output in Greece starting in 2008 has no precedent among modern developed economies. This project, joint with Loukas Karabarbounis and Rohan Kekre, combines direct measurement of macroeconomic shocks (fiscal policy, financial, household risk, external, productivity) with a rich dynamic general equilibrium model to provide answers to questions such as the relative role of fiscal austerity in explaining the collapse and prolonged slump and what would have happened had Greece not received bailout funds from the IMF and European Union. Our analysis identifies several important forces not emphasized in the existing literature on the Greek crisis or other major depressions, including a large decline in external demand for major Greek products such as shipping, rising labor and especially capital taxes during the bust and their interaction with financially-constrained firms, and a large rise in idiosyncratic risk and precautionary saving as long-term unemployment increased.

In **The 2000s Housing Cycle With 2020 Hindsight: A Neo-Kindlebergerian View** (Chodorow-Reich et al., 2021b), Adam Guren, Timothy McQuade, and I re-examine the 2000s housing cycle and show that it is not a boom-bust but rather a boom-bust-rebound. At the city level, areas with the largest house price increases during the boom had the largest busts but also the fastest growth after the trough in 2012 and as a result had the largest price appreciation over the full cycle. A spatial equilibrium framework of house prices determined by local income, amenities, and supply elasticity fits well the cross-section of city house price growth between 1997 and 2019. Using this framework, we identify a long-run fundamental component of house price growth in each city and show that areas with higher long-run fundamentals experienced larger booms, deeper busts, and faster rebounds. We use these fundamentals and other moments of the data to estimate a dynamic housing model where an asset cycle starts with an improvement in economic fundamentals, agents learn about fundamentals by observing "dividends" but over-extrapolate in the boom, and a price-foreclosure spiral drives prices below their long-run level in the bust. The model accounts quantitatively for the cross-city boom-bust-rebound pattern.

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