

Research statement

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I am an applied macroeconomist with particular research interests in the cyclical dynamics of labor markets; and inequality of long-run earnings risk over the business cycle.

This research agenda falls under the broad rubric of “macro-labor,” a quantitative discipline where macroeconomic models with a non-trivial role for population heterogeneity are confronted with micro-data, and vice versa. Economists in the field are usually specialists in some combination of applied theory, quantitative methods, and/or empirical analysis. I approach research questions in a manner that engages all three mediums. Thus, a typical paper in my research offers a novel empirical finding that permits direct insight towards a question of interest; proposes an economic model that offers a formal (and testable) theory that incorporates the new finding into the broader context of the motivating research question; and then applies structural empirical methods to evaluate whether the candidate model is quantitatively consistent with the novel empirical findings, and thus suitable for policy analysis.

In what follows, I discuss three specific areas of focus in my research: *(i)* the size and cyclicity of the earnings cost of job loss; *(ii)* the wage cyclicity of new hires; and *(iii)* the cyclical dynamics of temporary and permanent layoffs, with particular focus to the labor market recovery from the Covid-19 recession.

1 The size and cyclicity of the earnings cost of job loss.

Most economists believe that there is a trade-off in pursuing policies to promote long-run growth versus policies to stabilize the aggregate economy. Thus, quantitative models of the business cycle are useful for informing the relative welfare weight that a policy maker might attach to stabilization policy. However, recent research has shown that the size and cyclicity of the long-run earnings cost of job loss is far greater than previously imagined; and further documents that leading economic models of the business cycle are unable to match the observed size and cyclicity of the earnings cost of job loss (Davis and von Wachter, 2011). Thus, existing models understate the welfare benefits of stabilization policies.

My paper “**Understanding the Scarring Effect of Recessions**” (conditionally accepted, *American Economic Review*) resolves this gap in the literature. The first contribution of the paper is empirical: I document that the earnings cost of job loss is almost entirely concentrated upon workers who switch to lower-paying occupations, and that such “occupation displacement” is more common and costly

for workers who lose their job during a recession. Thus, occupation displacement accounts for the size and cyclical cost of job loss: a theory of the latter must necessarily offer a theory of the former. Furthermore, the empirical findings highlight substantial inequality in the cyclical cost of the distribution of long-run earnings risk: in a given year, only a subset of workers lose their job, and only a subset of those workers are exposed to the risk of occupation displacement. Thus, a successful model for explaining the cyclical cost of job loss must also offer a theory for the distribution of long-run earnings risk.

In the second part of the paper, I embed a theory of countercyclical occupation displacement into a dynamic model of equilibrium unemployment over the business cycle. In doing so, I propose a novel theoretical framework where selective hiring by firms may prevent an unemployed worker from finding reemployment in a job that utilizes previously accumulated skills. To recoup the fixed costs of finding a worker, firms posting more costly vacancies for higher-paying, “skill-sensitive” jobs hire selectively, only directing vacancies towards workers with skill above an endogenously determined threshold; other workers are left to search for lower-paying “skill-insensitive” jobs that do not utilize skill. During a recession, firms hire even more selectively, and thus the distribution of vacancies endogenously shifts towards skill-insensitive jobs.¹ Hence, a worker of middling skill who enters a recession employed in a higher-paying skill-sensitive job is exposed to a greater risk of occupation displacement: should such a worker lose their job and move to unemployment, the worker may no longer qualify for the type of job they previously held.

In the third part of the paper, I calibrate the model using a simulated method of moments estimator. The calibration procedure leaves moments describing the cyclical cost and persistence of the earnings losses of displaced workers untargeted, preserving these as outcomes by which the model can be evaluated. I show that the model successfully generates a countercyclical incidence of (and persistent earnings loss from) occupation displacement. Then, I simulate a large panel from the model, and I estimate the present value of the earnings cost of job loss using the method proposed in Davis and von Wachter (2011). The model is able to generate the large and cyclical earnings cost of job loss estimated from the data. I show that the key feature of the model that allows it to match the data is occupation displacement.

Finally, I assess the ability of the model to generate a cost of entering the labor market during the recession. A separate but related literature has documented that workers entering the labor market during a recession have persistently lower earnings, e.g. Kahn (2010). Rogerson (2011) conjectures that whatever forces are responsible for the cyclical earnings cost of job loss might also be related to the cost of entering the labor market during a recession. My paper offers support for this conjecture in two ways: First, the empirical literature has documented the importance of occupational placement in explaining the cost of entering the labor

¹See Hershbein and Kahn (2018) for empirical documentation of such countercyclical selective hiring.

market during a recession (Altonji, Kahn, and Speer, 2016; von Wachter, 2020). I document similar findings for the cyclical cost of job loss. Second, I estimate the cost of entering the labor market using simulated data from the quantitative model. The model produces estimates of similar magnitude to those discussed in von Wachter (2020).

Although motivated by a simple research question, the paper described above necessarily engages diverse areas within labor economics and macroeconomics. Hence, the paper offers several additional contributions that are tangential to the main message of the paper, but are nonetheless noteworthy. For example, I document that workers who lose their job during a recession are more likely to find re-employment in a job of a low skill service occupation, à la Autor and Dorn (2013). Thus, the paper offers additional micro-level evidence of countercyclical occupation polarization (Jaimovich and Siu, 2012). The paper discusses how the quantitative model is able to match key features of this important broader phenomenon.

2 *The wage cyclicalities of new hires*

Aggregate wage data shows relatively little variation in real wages compared to output. This observation has motivated the inclusion of some form of real wage rigidity in quantitative economic models to help account for business cycle variation. Motivated by similar considerations, Shimer (2005) and Hall (2005) show that incorporating some form of real wage rigidity into an equilibrium model of unemployment à la Diamond, Mortensen, and Pissarides greatly improves the ability of the model to explain unemployment fluctuations. An influential paper by Pissarides (2009), however, argues that it is the wages of new hires that matters for the cyclicalities of job creation; and in this regard, a volume of panel data evidence beginning with the seminal contribution of Bils (1985) shows that the wages of new hires are highly cyclical. Thus, Pissarides offers a powerful critique of the manner in which macroeconomists typically incorporate wage rigidity in quantitative models.

My paper with Mark Gertler and Antonella Trigari, “**Unemployment Fluctuations, Match Quality, and the Wage Cyclicalities of New Hires**” (*Review of Economic Studies*, 2020) revisits such evidence of new hire wage cyclicalities, and we reassess the associated implications for unemployment volatility. We argue that an interpretation of new hire wage cyclicalities as direct evidence for wage flexibility ignores confounding cyclical variation in wages that is due to workers moving to better job matches during expansions. Failure to control for this composition effect on wages generates significant upward bias in estimates of the procyclicality of the marginal cost of labor. Based on theory and evidence, we argue that such cyclical composition bias should be more pervasive among new hires making job-to-job changes. Correcting for such cyclical composition bias, we obtain estimates indicating that wages of new hires are no more flexible than those of existing workers. Thus, the sluggish cyclical behavior of the marginal cost of labor is accurately reflected in

the wages of continuing workers (and aggregate wages), offering a justification for the inclusion of wage rigidity in quantitative macroeconomic models.

First, to develop a composition-free estimate of the wage cyclicality of new hires, we construct a unique dataset from the Survey of Income and Program Participation (SIPP) that allows us to separately estimate the wage cyclicality of new hires from unemployment versus that of those making job-to-job transitions. We first show that by pooling the two types of new hires with our data, we can replicate the typical result of the existing literature: new hire wages appear to be more flexible than the wages of continuing workers. When we estimate separate terms for both types of new hires, however, we find no evidence of excess wage cyclicality for new hires coming from unemployment, but substantial evidence of procyclical match upgrading among workers making job-to-job transitions.² Thus, we argue that the low-variability of existing workers' wages offers a better guide to the cyclicality of the marginal cost of labor than does the high volatility of new hire wages that are not adjusted for composition.

Then, we develop a quantitative macroeconomic model that can simultaneously account for both the aggregate and panel data evidence. We construct a model of equilibrium unemployment with three key features: *(i)* staggered contracting, *(ii)* variable match quality, and *(iii)* on-the-job search with endogenous search intensity. Crucially, the wages of new hires within the model are no more flexible than those of existing workers; yet, when we estimate the typical regression from the literature on a model-simulated panel, we obtain estimates that could be erroneously interpreted as evidence for flexible wages among new hires. By construction, however, the estimates are driven by cyclical composition bias. Thus, when we estimate a regression specification that allows separate wage elasticities for job-changers and new hires from unemployment, the estimates are similar what we obtain from the SIPP: the wages of new hires from unemployment are no more cyclical than the wages of continuing workers, but the wages of job-changers are highly procyclical due to cyclical match-upgrading.

Finally, our quantitative model illustrates the importance of the distribution of match quality of workers across jobs for generating a full recovery from a recession. In our model, a reduction in the unemployment rate after a recession is a necessary but not sufficient condition of a full economic recovery from a recession. A full recovery is only possible when average match quality across jobs recovers to its pre-recessionary level, which is achieved by workers upgrading to better matches via on-the-job search. Thus, our model illustrates a link between the slow recovery of the economy after the Great Recession and the well-documented post-recession collapse of the so-called "job ladder" by which workers move to better matches

²Since the publication of the paper, our findings have been replicated by researchers using other datasets, e.g. by Bauer and Lochner (2020), using German administrative data from the SIAB; by Figueiredo (2020), using the NLSY; and Grigsby, Hurst, and Yildirmaz (2021), using payroll data from ADP.

(Moscarini and Postel-Vinay, 2016; Haltiwanger et al., 2018).

3 Temporary and permanent layoffs over the business cycle

A signature feature (and anomaly) of the most recent recession was the massive flow of workers into temporary layoff: by some estimates, roughly 15% of workers in employment moved from employment to temporary layoff between March and April 2020 alone. An immediate concern of policymakers and economists was that this sharp increase in temporary unemployment might translate into large and persistent increases in permanent unemployment. Thus, Congress passed the Payroll Protection Program (PPP), which comprised the largest single component of the federal government fiscal response to the pandemic. The program delivered forgivable loans to firms to encourage the recall of workers from temporary layoff, with the broader goal of keeping the increase in temporary unemployment “temporary.” While the labor market has improved over the last year and a half, it is not possible to tell from the raw time series alone how successful the PPP program was. Doing so, ideally, requires a structural model

In current work with Mark Gertler and Antonella Trigari, entitled “**A Model of Temporary versus Permanent Layoffs over the Business Cycle: with an Application to the Covid-19 Crisis,**” we offer a structural evaluation of the employment effect of PPP. We develop a general equilibrium model of unemployment fluctuations with two types of unemployment: *temporary unemployment*, where workers on temporary layoff wait to be recalled to their previous employer; and *permanent unemployment*, where workers who are permanently separated from their previous employer search for new jobs. The rates at which workers move from temporary and permanent unemployment to employment depend on the recall and hiring decisions of the firm. The flows of workers from employment to temporary and permanent unemployment, in turn, depend on the decisions of firms to place workers on temporary or permanent layoff. Then, although wages are set according to multi-period contracts, firms may cut wages temporarily to avoid bankruptcy. If a firm goes bankrupt, all of the firm’s workers in temporary unemployment move to permanent unemployment. The resulting model (with three stocks and five endogenous flows) offers all of the necessary ingredients for describing employment dynamics during the first year of the Covid-19 crisis, as well as for evaluating the employment effect of PPP.

Though it is the recent recession that provides the main motivation for our model, temporary unemployment has shaped the cyclical dynamics of unemployment to various degrees across all of the postwar recessions. Thus, we calibrate the model to match the dynamics of temporary unemployment, permanent unemployment, hiring, recalls, and separations using CPS data from 1979 to 2019. Our model does well at matching the data. We establish from our model that the division of unemployment into temporary and permanent allows firms to adjust more flexibly

to aggregate shocks, thereby decreasing the persistence of total unemployment.

We then adapt the model to study the labor market at the onset of the Covid-19 pandemic, as well as the specific role of PPP. We show that the model can capture well the dynamics of total unemployment as well as the breakdown between temporary and permanent. In addition to capturing the evolution of the stocks, the model also explains well the flows between different types of labor market status over the recession. We then apply our model to evaluating the effectiveness of PPP. To do so, we use the quantitative model to analyze a counterfactual scenario where PPP is removed. The analysis shows that PPP was successful in fulfilling its primary mandate of preserving ties between firms and workers on temporary layoff. From May to October 2020, firms recalled twice as many workers as they would have in the absence of PPP; and half as many workers in temporary layoff lost their previous position permanently as would have without PPP. Accordingly, we estimate substantial employment effects of PPP over the same period, with monthly employment gains from PPP averaging 2.14 percentage points. We estimate the employment effects of PPP to be highly persistent, with employment still around one percentage point higher in May 2021 than it would have been absent PPP.

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