

# Research Statement

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## Summary

I am interested in understanding the determinants of individuals' labor market outcomes. More specifically, my research seeks to understand the forces that influence and constrain individuals' ability to find work. I study these forces at the individual and aggregate level, using a combination of theory and data, and often with a focus on the role of information—elements of uncertainty, learning, beliefs, and expectations run through much of my work.

My recent research is organized around three such forces: (1) *Search and unemployment*—how workers' decisions to search for work and their behavior during unemployment are influenced by factors such as uncertainty, learning, asymmetric information, and habit-formation; (2) *Beliefs, expectations, and aggregate fluctuations*—how endogenous changes in workers' beliefs, or changes in expectations about the future, can act as independent drivers of aggregate fluctuations in unemployment and thus job-finding rates; and (3) *Labor market policy*—how policies that directly affect labor mobility, such as restrictions on non-compete contracts and bans on discrimination in hiring, can impact the job-finding prospects of employed and unemployed workers.

To study these forces, my research makes use of a range of theoretical and empirical tools. My theoretical work considers partial equilibrium models of job search, games of asymmetric information, and dynamic general equilibrium models. My empirical work uses reduced-form dynamic panel data methods, structural vector autoregressions, simulation-based method-of-moments estimators, text analysis/natural language processing, and qualitative analysis of primary historical documents.

In what follows, I elaborate on each of the three strands of my research described above, including discussion of published papers, working papers, and on-going work.

## 1. Search and unemployment

An important force governing individuals' ability to find work is job search. A substantial part of my research agenda, which I discuss below, studies the nature of search decisions, both on and off the job, as well as other aspects of decision-making during unemployment.

### Information, beliefs, and job search

The structure of information is a central component of job search. This fact can be seen starting with the earliest theoretical work on search decisions (Stigler, 1961; McCall, 1970),<sup>1</sup> all the way through modern empirical work testing these (and related) theories using data

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<sup>1</sup>Stigler's paper was entitled "The Economics of Information," while McCall's was "Economics of Information and Job Search."

on, e.g., workers’ perceptions of the search and job-finding process (Mueller and Spinnewijn, 2022). My work engages with both the theoretical and empirical aspects of this literature.

A central assumption in much of the search literature is that job seekers know precisely the rate at which job offers will arrive. In “**Learning and Job Search Dynamics during the Great Recession**”,<sup>2</sup> I challenge this assumption. The paper begins by revisiting an important empirical observation made by Krueger and Mueller (2011): During the Great Recession, search effort declined the longer a worker was unemployed.<sup>3</sup> Revisiting their analysis, I document two new facts: (i) The observed decline in search effort over the spell is explained by variation in workers’ search effort since job loss—i.e., it is past search effort, rather than unemployment duration per se, that explains declining effort over the spell, and (ii) receiving (and rejecting) a job offer stimulates search effort. These facts suggest that workers are uncertain about their job-finding prospects and learn from their experiences searching. I formalize this idea by considering a model of sequential search in which job seekers are uncertain about the rate at which offers will arrive and learn as a result of both their past search effort and the returns to that effort in the form of job offers. This model explains the facts documented at the start of the paper, provides theoretical insight into the phenomenon of “discouragement,” and, when estimated via a simulated method-of-moments procedure, reveals that job seekers substantially overestimate their job-finding prospects at the time of job loss, consistent with outside evidence from subjective probability elicitations. Taken together, these results point clearly towards an important role for uncertainty and learning in the search and job-finding process that has long been neglected in the literature.

The preceding suggests that the phenomenon of discouragement may be an important feature of the experience of joblessness. This idea has a long history: In its 1979 report to Congress, the Levitan Commission identified non-participation due to discouragement as not just a problem of unused productive capacity, but as one of three principal sources of labor market hardship.<sup>4</sup> In my short paper, “**The Discouragement Rate: An Index of Discouragement-Induced Hardship**,”<sup>5</sup> I turn to the largely overlooked Chapter 5 of the Levitan Commission’s report, and find in it an exhortation for the construction of an index to measure the extent of discouragement-induced hardship.<sup>6</sup> Accordingly, I propose such an index that is both easy to construct and interpret, and use it to document several stylized facts about the evolution of discouragement over time and across demographic groups.

While the two papers above focus on how the *experience* of unemployment can influence search decisions—reduced search effort or even complete labor force withdrawal in the case of discouraged workers—it is also possible that *expectations* of unemployment can influence

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<sup>2</sup> *Journal of Monetary Economics* (2021).

<sup>3</sup> This finding is based on the Survey of Unemployed Workers in New Jersey (SUWNJ), a weekly longitudinal survey that followed unemployed workers for up to 26 weeks during the height of the Great Recession. See Krueger and Mueller (2011) for details.

<sup>4</sup> National Commission on Employment and Unemployment Statistics, *Counting the Labor Force*. G.P.O., 1979. The so-called “Levitan Commission” is well-known for Chapter 4 of its report and for deciding to not include discouraged workers as part of the labor force.

<sup>5</sup> *Applied Economics Letter* (2021).

<sup>6</sup> Currently, the only widely reported statistic reflecting the extent of discouragement in the United States is the U4 unemployment rate, which makes no distinction between discouraged workers and unemployed workers; the groups are simply added together to form a broader measure of excess productive capacity.

search decisions of employed workers, albeit through a different informational mechanism. In “**Wage Offers and On-the-job Search**” (with Dan Bernhardt),<sup>7</sup> we study the possibility that, when firms have private information about their future viability, the wages they offer will potentially convey information to workers, who in turn may wish to engage in precautionary on-the-job search to avoid a spell of unemployment if shutdown is likely. Because such search is costly to firms that remain viable, a firm’s wage-setting decision will reflect not only the direct labor cost of a higher wage, but also the information that any particular wage offer will convey to its workers. We identify the unique perfect sequential equilibrium wage strategy for firms, and show that it is characterized by a large pooling region in which wages are invariant to a firm’s private information about future viability, as well as a discontinuous fall when remaining viable is unlikely. We argue that these implications can help to explain downward wage rigidity (Altonji and Devereux, 2000), the existence of advance notice laws (e.g., the Worker Adjustment and Retraining Notification Act of 1988), and excess kurtosis in earnings growth distributions (Karahan et al., 2020).

### Unemployment and habit-formation

In the recent podcast “Rabbit Hole,” *The New York Times* chronicles how the internet is changing how we spend our time, beginning with a story about how immersive Youtube viewing led to the political radicalization of an unemployed college dropout.

Interested in whether this type of immersive internet use can be detected in quantitative data on the behavior of unemployed workers, in “**Down the Rabbit Hole: Habit-formation in Internet Use among Unemployed Workers**”,<sup>8</sup> I return to the SUWNJ data described above and ask a simple question: Is internet use habit-forming for unemployed workers? Unemployment represents a unique opportunity to study habit-formation in internet use because, among other things, it usually entails a windfall of time that can be allocated to new forms of leisure. Exploiting this observation, I adapt a standard model of habit-formation in consumption (as in, e.g., Deaton (1992)) to leisure choice and derive a test for habit-formation in various leisure activities. The results show robust evidence of habit-formation in internet use, driven, somewhat surprisingly, by Generation-X workers rather than by Millennials. Moreover, I find no evidence of habit-formation in most *offline* leisure activities. These observations have potentially important implications for the trade-offs governing the labor supply of unemployed workers, such as those considered by Aguiar et al. (2021), as well as for policies aimed at influencing labor supply decisions and recent policies intended to limit social media use.<sup>9</sup>

## **2. Beliefs, expectations, and aggregate fluctuations**

A second force that influences individuals’ ability to find work is aggregate fluctuations in unemployment. There is a long history in macroeconomics of the idea that such fluctuations could be driven by autonomous changes in individuals’ beliefs or expectations of the future. My research studies two modern manifestations of this idea: One building on the idea that news about the future can produce booms and busts in the economy, and one proposing

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<sup>7</sup> *Canadian Journal of Economics* (2022).

<sup>8</sup> *Economics Letters* (2022).

<sup>9</sup>For example, the 2019 Social Media Addiction Reduction Technology (SMART) Act proposed a daily 30-minute limit on social media apps.

a theory in which fully rational changes in unemployed workers' beliefs can independently function to permanently change the path of the labor market.

### News shocks

Beginning with the work of Beaudry and Portier (2006), a recent literature has revived the idea of Pigou (1927) that news about future changes in labor productivity can potentially contribute substantially to fluctuations in unemployment.

In “**Anticipated Productivity and the Labor Market**” (with Ryan Chahrour and Sanjay Chugh),<sup>10</sup> we reinvigorate this idea, both empirically and theoretically. Empirically, rather than presupposing that such news shocks are quantitatively important, we begin with a simple question: What drives the comovement between the labor market and the rest of the economy? To answer this question, we propose to agnostically identify the shock that explains the largest share of joint fluctuations in output and hours. We find that this shock looks surprisingly similar to the news shocks that existing literature has explicitly set out to identify, and accounts for a large share of aggregate fluctuations in the economy. Theoretically, we show that the empirical responses to shocks to expectations about future productivity are consistent with the responses implied by a standard frictional model of the labor market under a simple cash-flow sharing model of wage determination—but not under Nash bargaining. We conclude that the data support an important role for shocks to expectations in driving labor market fluctuations and thus workers' job-finding prospects.

### Self-fulfilling beliefs

Shocks to expectations of future productivity are just one way in which beliefs and expectations can exert an influence on the labor market. A related literature, with important early contributions from Diamond (1982) and Diamond and Fudenberg (1989), has reinvigorated Keynes's (1936) notion of “animal spirits,” in which self-fulfilling beliefs can generate aggregate fluctuations in unemployment.

In “**Destabilizing Search Technology**,”<sup>11</sup> I propose a theory of self-fulfilling fluctuations, driven by modern search technologies that allow workers to monitor new job postings.<sup>12</sup> Specifically, the paper begins from the observation that such monitoring technologies enable workers who actively monitor new job postings to apply for jobs *before* those who do not. The consequence is a rat race for jobs among unemployed workers, in which a belief that others are monitoring new postings necessitates doing the same to avoid falling to the back of the queue. In the context of a simple job search game among unemployed workers, I show that this dynamic gives rise to a strong source of strategic complementarities in monitoring decisions that can lead to multiple equilibria. Put differently, the model features “animal spirits” emerging from the beliefs of unemployed workers looking for jobs. In the context of a quantitative macroeconomic model of the labor market, I show that three Pareto-ranked steady states emerge, consistent with the equilibria of the simple game. Moreover, for a range of initial conditions, the economy can converge to any of these steady states, implying that autonomous changes in unemployed workers' beliefs can permanently alter the path of

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<sup>10</sup>Revision requested, *Quantitative Economics*.

<sup>11</sup>Working paper.

<sup>12</sup>For example, most online job boards feature “job alerts” that notify workers of new listings as soon as they are posted.

the economy. This observation provides both a theory of endogenous labor supply shocks and, as I show, can explain several unique features of the recovery from the Great Recession.

### 3. Labor market policy

A third force that influences both employed and unemployed individuals' ability to find work is labor market policy. Some of my more recent research focuses on two such policies: policies restricting the use of non-compete agreements for low-wage workers and policies banning discrimination against unemployed workers in help-wanted ads.

#### Non-compete agreements

Over the past ten years, it has come to light that workers for a number of large, well-known, low-wage employers are subject to non-compete agreements (NCAs).<sup>13</sup> This observation has led to intense public and media scrutiny on the grounds that the usual rationales for NCAs are not relevant for low-wage workers.<sup>14</sup>

In “**On the Inefficiency of Non-Competes in Low-Wage Labor Markets**” (with Bart Hobijn and Andre Kurmann),<sup>15</sup> we contribute to this conversation by seeking to understand the implications of mobility-restricting policies, such as NCAs, for social welfare in low-wage labor markets. Our work is motivated by the observation that, while there is some evidence on the empirical effects of NCAs for low-wage workers,<sup>16</sup> there is no existing theoretical work studying what such policies do—and, in particular, how they influence welfare—in a workhorse general equilibrium model of labor turnover. Accordingly, we consider the role of mobility-restricting policies in a variation on the classic model of labor turnover in Burdett and Mortensen (1998). We first document that our model is consistent with empirical work on the effects of NCAs on low-wage workers. We then theoretically characterize optimal NCA policy, emphasizing interactions with the minimum wage. Finally, we propose two approaches to quantitatively assess the efficiency of NCAs. First, using a robust sufficient statistic approach derived from the model, we show that NCAs are likely to be *inefficiently restrictive* in low-wage U.S. labor markets. Second, we use a calibrated version of the model to show that Oregon’s 2008 NCA ban for low-wage workers was efficiency enhancing. We thus conclude that there is a strong efficiency rationale for restricting the use of NCAs in low-wage labor markets.

Our work discussed above is primarily theoretical in nature. In related on-going work, “**The Effects of NCAs on Low-Wage Workers: Evidence from State-Level NCA Bans**” (with Bart Hobijn and Andre Kurmann),<sup>17</sup> we are in the process of providing more systematic evidence on the empirical effects of NCAs in low-wage labor markets. Specifically,

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<sup>13</sup>Examples of such employers include Amazon, Jimmy John’s, McDonald’s, Burger King, and Jiffy Lube.

<sup>14</sup>The use of NCAs in low-wage labor markets has been covered by a number of high-profile media outlets: *The New York Times*: “How Non-Compete Clauses Keep Workers Locked In”; *The Washington Post*: “Even Janitors Have Non-Competes Now. Nobody is Safe.”; *Financial Times*: “Cushman v. the Cleaner: The Fight over Non-Competes”; and *The Wall Street Journal*: “The Non-Compete Agreement is Now Ridiculously Abused”.

<sup>15</sup>Working paper.

<sup>16</sup>See below for a discussion of our on-going empirical work on this topic. For existing work, see Starr et al. (2021) and Lipsitz and Starr (2021).

<sup>17</sup>Work in progress.

we have constructed a state-level panel of NCA enforceability for low-wage workers, taking advantage of the Bishara (2011) state-level NCA enforceability index and the spate of state-level bans on NCAs for low-wage workers over the past five years.<sup>18</sup> We are currently working on using Quarterly Workforce Indicator (QWI) data to identify the local labor market effects of NCAs for workers in low-wage industries (e.g. NAICS 722) using a border-county discontinuity design. Our hope is that this work will provide a richer body of empirical evidence to inform state-level NCA policies targeted specifically at low-wage labor markets.

#### Discrimination against the unemployed

In 2011, *The New York Times* ran an article by Catherine Rampell documenting anecdotal evidence of employers explicitly stating in online help-wanted ads that unemployed and long-term unemployed workers should not bother to apply.<sup>19</sup>

In on-going work, “**Unemployed Need Not Apply: A Text Analysis of Employment-Status Discrimination in Help-Wanted Ads**” (with Kamyar Kamyar),<sup>20</sup> we study this type of discrimination. Specifically, we have two principal goals: The first is to systematically document the prevalence of discrimination based on employment status in the U.S. labor market. To do so, we are using establishment-level textual job-posting data from LinkUp<sup>21</sup> and applying natural language processing (NLP) techniques to identify, describe, and quantify how employers screen applicants based on employment status through the language in help-wanted ads. The second goal is to study the implications of this type of discrimination for the job-finding prospects of unemployed workers. We are particularly interested in its effects on marginalized populations for whom unemployment rates are already relatively high, suggesting that such groups may disproportionately bear the burden of employment status discrimination. We plan to estimate the effects of observed state-level policies banning this type of discrimination (which have been legislated in New Jersey, Oregon, and Washington, D.C.) on both the prevalence of such hiring practices in the LinkUp data and on job-finding rates, disaggregated by race, in QWI data. We think this is particularly interesting because the effects of such policies are theoretically ambiguous: Banning employers from discriminating against unemployed workers may improve the job-finding prospects of, e.g., certain racial groups that have historically had high unemployment rates; on the other hand, such bans may induce firms to substitute towards statistical discrimination using *proxies* for unemployment—including, potentially, race.<sup>22</sup> In addition to the goals stated above, our research aims to empirically disentangle these forces.

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<sup>18</sup>Since 2017, eight states have restricted the use of NCAs for low-wage workers: Illinois (2017), Massachusetts (2018), New Hampshire (2019), Maine (2019), Maryland (2019), Washington (2020), Rhode Island (2020), and Virginia (2020).

<sup>19</sup>“The Help-Wanted Sign Comes with a Frustrating Asterisk” (*The New York Times*, 2011).

<sup>20</sup>Work in progress.

<sup>21</sup>LinkUp provides detailed information on job listings sourced directly from employers’ websites.

<sup>22</sup>This part of our work thus recalls the important recent work on policies that “ban the box” (Doleac and Hansen, 2020).

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