

RESEARCH STATEMENT

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My research interests lie at the intersection of environmental economics, labor economics, and macroeconomics. I strive to understand the functioning of labor markets. My researches explore two main questions: first, how labor markets adjust to shocks, and second, how labor markets distribute unemployment incidences across workers.

Over decades, economists have been studying how unemployment and wages respond to cost shocks like oil crises, sectoral shocks like environmental policies, trade shocks, etc. While a large body of literature studies the unemployment and wage effects of these shocks, I am more interested in the process through which the unemployment and the wage effects operate—the functioning of labor markets. For example, do these shocks increase unemployment because job loss becomes increasingly common or because finding a job becomes harder? We learn from textbooks about the sticky wage hypothesis—wages are not easily adjusted downward because of labor contracts. If this hypothesis is valid, how are wages adjusted to negative shocks? Why are unemployment rates more volatile than wage rates?

My first thesis chapter, “**On the Labor Market Consequences of Environmental Taxes**”, examines the unemployment effect of sectoral shocks created by an environmental policy. Earlier literature documents that environmental policies reduce manufacturing employment. Meanwhile, many argue that these policies may shift employment from manufacturing sectors to others and these policies may create job opportunities such as *green* jobs, making the overall employment effect ambiguous. This paper, published in *Journal of Environmental Economics and Management* in 2018, exploits the introduction of a carbon tax in the Canadian province of British Columbia (BC) to answer whether environmental policies increase unemployment. Using a difference-in-differences (DID) approach, this paper finds that the sectoral shock of BC’s carbon tax increases the unemployment rate and the increased unemployment is more likely involuntary. While this paper documents the unemployment effect of BC’s carbon tax, it is silent on the wage effect and is silent on the mechanism through the unemployment and wage effects operate.

My job market paper, “**The Ins and Outs of Employment: Labor Market Adjustments to Carbon Taxes**”, exploits the same policy to investigate the process through which jobs and wages are cut. Combining matching with a DID approach, I find that the tax increases the unemployment rate by 1.4 percentage points and decreases wages by 2.7 percent. My paper reveals that employment flows—the flow into and out of employment—are the key to understanding how the unemployment and wage effects operate. Unemployment increases for two reasons: job loss becomes increasingly common and finding a job becomes harder. Since the former effect is short-lived, the unemployment effect decays. A small unemployment effect persists because the latter effect stays long. Wages are cut through labor turnover: while incumbent wages are completely rigid, hiring

wages plunge. Average wages are slowly adjusted to the gradual increase in the proportion of new hires in employment. The unemployment and wage adjustments last at least seven years, longer than many expect.

Although the unemployment effect of BC's carbon tax is significant and long-lasting, this paper finds that a majority of unemployed workers can find jobs within half a year. While the entitlement period of unemployment benefits are often substantially extended in downturns, this paper finds that there is no urge to accommodate sectoral shocks of environmental policies with substantial extensions of unemployment benefit periods. Meanwhile, the unemployment and the adverse wage effects are found larger for less-educated workers, revealing the regressivity of environmental policies from the source side of labor income. Hence, this paper uncovers the distributive costs in the labor market that are often neglected in the literature on the costs associated with environmental policies.

In addition to the labor market adjustments to sectoral shocks created by environmental policies, I also conduct theoretical researches investigating how labor markets distribute unemployment incidences across workers. A matching function represents the formation of production units from the pools of job vacancies and job applicants. An extensive literature assumes a matching function, analogous to a production function, a specific functional form such as the "Cobb-Douglas" form. In the literature, a typical matching function implies an identical job-finding rate, inconsistent with empirical regularities. My paper, "**Search Relativity**", presents microfoundations unmasking a matching function that yields heterogeneous job-finding rates. This paper explores the implications of three central assumptions: (i) vacancies have incomplete information about applicants' productivities, (ii) job applicants polish their job applications to signal their productivities with their search qualities, and (iii) vacancies decide a hiring rule. By embodying these assumptions, two interesting equilibria emerge, one of which yields a canonical search and matching model with an identical job-finding rate. The other one yields a new class of search and matching model, in which a job-finding rate increases with the rank in a search quality distribution. The new class of model has several important implications relating the unemployment incidence of each individual to the aggregate unemployment rate, explaining almost entirely the heterogeneity in the unemployment incidence.

In a nutshell, my research uses novel identification strategies to understand how labor markets adjust to sectoral shocks of environmental policies and constructs theoretical models to explain how labor markets distribute unemployment incidences across workers, both of which enhance our knowledge about the functioning of labor markets.