Heterogeneous Relationships between Employment Insurance Receipt and Job Search

by

Xiao Feng

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Name: **Xiao Feng**
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Examining Committee:

Chair: Irene Botosaru, Assistant Professor

Andrew McGee
Senior Supervisor
Assistant Professor

Hitoshi Shigeoka
Supervisor
Assistant Professor

Luba Petersen
Internal Examiner
Assistant Professor

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Abstract

I explore the heterogeneous relationships between Canada's Employment Insurance (EI) program and job search intensity before, during and after the recent financial crisis among different subgroups of workers in Canada. I find a significant, positive relationship between job search intensity and EI benefits. The positive relationship between EI benefits and job search hours is largest for women, while the positive relationship between EI benefits and job search expenditures is largest for among workers from poor households. EI recipients experience longer unemployment durations than non-recipients, but the unemployment durations for EI recipients during the recession are shorter than before the recession. My findings have important implications for policy-makers wishing to target EI benefits among populations where such benefits will have the greatest impact.

Keywords: job search, employment insurance, financial crisis, labour economics

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1. Introduction

The goal of Canada's Employment Insurance (EI) program is to provide temporary financial assistance to Canadians who lose their jobs as a result of employer cutbacks.[1] During the most recent financial crisis, the number of unemployed individuals increased, the duration of unemployment increased, and more individuals claimed EI than prior to the recession (Statistic Canada, 2014). While policymakers in the U.S. used EI programs extensively during the crisis as a tool to help the unemployed (Rothstein 2011), Canada did little to its EI program in the same period. The idea of adapting EI policy to macroeconomic conditions is intriguing and has tremendous potential. Little is known, however, about how the effects of EI benefits are related to macroeconomic conditions. In this sense, Canada's decision to keep EI policy unchanged even as macroeconomic conditions deteriorated rapidly affords us a unique opportunity to identify the relationships between EI receipt and the behavior of the unemployed.

I use Canadian data from 2000-2012 to explore the heterogeneous relationships between EI benefits and search hours and expenditures before, during and after the financial crisis among a variety of subgroups. I employ a standard model of unemployed job search with endogenous job search intensity to study the relationship between EI benefits and search intensity. I use data from the cross-sectional Employment Insurance Coverage Survey (EICS) to analyze the relationships between EI benefits, search hours and expenditures for men, women and individuals in rich and poor households before (2000-2006), during (2007-2009) and after (2010-2012) the recession. Finally, I use the Survey of Labour and Income Dynamics (SLID) to estimate the relationship between EI benefit receipt and the duration of unemployment spells in these different periods using a Cox proportional hazard model.

[1] To qualify for EI benefits, recipients must have lost their job through no fault of their own and been without work and pay for at least seven consecutive days within the last year (Services Canada, 2013). Entry requirements also require a number of hours, between 420 and 700 hours depending on the regional unemployment rate of insurable employment. Over the last decade, no significant changes have affected EI policy in Canada except for the adjustment of EI premiums and the maximum insurable income (Service Canada, 2013). The weekly EI benefits are measured by a function of the number of weeks worked in the last 26 weeks, a divisor that depends on the regional unemployment rate and the total income received of those same 26 weeks.

Using OLS, I find that the correlations between EI benefits and hours and money spent on job search are positive between 2000 and 2012. The positive relationship is consistent with what one would expect in a standard job search model in which workers are credit constrained. The constraint leads workers to spend a suboptimal amount of time and money on job search; relaxing this constraint leads to greater search intensity. I find that the positive estimated relationship between EI benefits and job search expenditures is nearly three times larger during the recession than during other periods. The relationship between EI benefits and search intensity also varies quite a bit among workers. Specifically, the relationship between EI benefits and job search hours is larger for women than for men, while the relationship between EI benefits and job search expenditures is larger among individuals from poorer households than from wealthier households. During the recession, I find that individuals from both rich and poor household spent more money on job search than during other periods. I also find that EI recipients are less likely to exit unemployment than non-recipients in all periods, but this relationship was attenuated during the recession.

EI benefits themselves, however, are likely correlated with unobserved characteristics of the job seeker as they depend in part on previous earnings and labor force attachment. To address this potential endogeneity, I estimate the models using the average EI benefits for a similarly educated individual in the respondent's province of residence as an instrument for the EI benefits received. Using these two-stage least square (2SLS) estimates, I find that individuals exert more effort on job search when receiving EI during the recession than during other periods. My other 2SLS estimates of the effects of EI benefits of search behavior are broadly similar to the OLS estimates, but the estimates themselves are not particularly precise.

The findings of this study are relevant for EI policy-makers. Poor households are credit-constrained, and this is probably most true during economic downturns. Among these workers, the marginal effect of EI benefits on job search expenditures can be especially is large during recessions. If one were to assume that my estimates capture the causal effect between EI benefits and search intensity and unemployment duration, policy-makers might wish to provide more benefits for the poor and to increase EI benefits during recessions.

2. Literature Review

A number of papers have studied the relationship between job search and unemployment insurance. Krueger and Mueller (2010) used "minutes spent looking for work" as a proxy of job search intensity and found that job search intensity in the U.S. is negatively related to the maximum weekly EI benefit amount. Their elasticity estimates imply that a 1% increase in the benefit amount is associated with 1.6% to 2.2% fewer minutes per day in job search. I also estimate the relationship between search hours and EI benefit amount in Canada, but I additionally measure search intensity using job search expenditures.

A number of recent studies such as Acemoglu and Shimer (1999), Bloemen and Stancanelli (2001) and Lentz and Tranaes (2005) reveal a negative relationship between job search intensity and household wealth holding. Unemployed people with less wealth have less ability to smooth consumption and, therefore, may have more incentive to search for jobs when receiving EI benefits. With this in mind, I examine how the relationships between EI benefits and search intensity depend on measures of household wealth.

My study uncovers a positive relationship between EI benefits and the duration of unemployment in Canada that is consistent with the findings in Ham and Rea (1986), Meyer and Katz (1988) and Meyer (1990). Meyer and Katz (1988) find that an increase of one week of UI benefits increased unemployment spells among UI recipients from about 0.16 to 0.20 weeks in the U.S. alone. In the study perhaps most similar to my own insofar as they also consider how the effects of EI benefits depend on macroeconomic conditions, Kroft and Notowidigdo (2011) find that the positive correlation between UI benefits amount and unemployment spell durations is strongest when the state unemployment rate is low. Indeed, the correlation between EI benefits and unemployment duration is not statistically significant when the state unemployment rate is high. Similarly, I estimate the relationship between the exit rate and EI benefits in the pre-recession, recession and post-recession periods, but my study is the first to examine the impact of the financial crisis on the effects of EI benefits in Canada.

3. Models

Following Mortensen (1978), I consider a discrete time and infinite horizon job search model with endogenous job search intensity and reservation wages. I depart from the model by assuming search intensity has two dimensions: search time h_t and search expenditures s_t. This model assumes that the monetary costs of looking for job are $c(s_t)$, where $c'>0$ and $c''>0$; the opportunity cost of search is in terms of foregone leisure which I discuss below. Each unemployed person receives a job offer as a function of search effort with probability, $g(s_t,h_t)=\left(s^{\rho}+h^{\rho}\right)^{\frac{1}{\rho}}$, where $\rho=1$ if search time and search expenditures are perfect substitutes and $\rho\to-\infty$ if they are perfect complements. The utility of leisure is $u(l)$, where $u'(.)>0$ and $u''(.)<0$.

A job seeker chooses job search time and expenditures and a reservation wage to maximize utility. Specifically, the job seeker solves the following maximization problem:

$$\max_{s_t\in[0,\infty)} m-c(s_t)+u(l)+\beta\left[g(s_t,h_t)E\max\left\{V_{t+1}^{E}(w),V_{t+1}^{U}\right\}+\left(1-g(s_t,h_t)\right)V_{t+1}^{U}\right] \tag{1}$$

subject to: $m-c(s)\geq 0$ (2)

$$l=24-h \tag{3}$$

where m are the EI benefits, β is the discount rate, V_{t+1}^{U} is the utility of remaining unemployed in the next period and $V_{t+1}^{E}(w)$ is the expected utility of being employed in the next period, $m-c(s)\geq 0$ is the credit constraint, and $h=24-l$ is the time constraint.

The reservation wage is given by:

$$w_r=(1-\beta)V^{U}=m-c(s)+u(l)+\frac{\beta}{1-\beta}g(s,h)\int_{w_r}^{\infty}(w-w_r)dF(w) \tag{4}$$

The Lagrangian maximized by the job seeker is

$$L = m - c(s_t) + u(24-h) + \frac{\beta}{1-\beta} g(s,h) \int_{w_r}^{\infty} (w - w_r) dF(w) + \lambda(m - c(s)) \quad (5)$$

where λ is the Lagrange multiplier.

The optimal search time solves the first-order condition:

$$u'(24-h) = \frac{\beta}{1-\beta} g(s,h) \int_{w_r}^{\infty} (w - w_r) dF(w) \quad (6)$$

The optimal search expenditures solves the first-order condition:

$$c'(s) = \frac{\beta}{1-\beta} \frac{\partial g(s_t, h_t)}{\partial s} \int_{w_r}^{\infty} (w - w_r) dF(w) \quad (7)$$

The exit rate from unemployment to employment is $e(s,h,w_r) = \Pr(offer = 1 | s,h) \Pr(w \geq w_r)$, where $offer = 1$ means individual receives an offer. Higher search intensity and reservation wages have opposite effects on the exit rate. The probability of receiving an offer increases as search intensity increases; therefore the exit rate from unemployment increases. Setting higher reservation wages, on the other hand, increases the probability that an offer is rejected, and thus the exit rate from unemployment decreases as the reservation wage increases.

The model predicts that the relationship between EI benefits and reservation wage is positive for the unemployed, $\frac{\partial w_r}{\partial m} > 0$. The relationship between EI benefits and search intensity is positive if search time and search expenditures are complements. That is, if search time and search expenditures are complements in the job offer production function, then $\frac{\partial s}{\partial m} > 0$ and $\frac{\partial h}{\partial m} > 0$ provides the following condition is satisfied

$$-(1+\lambda)c''(s) + \frac{\beta}{1-\beta} g_{ss}(s,h)Q < u''(24-h) + \frac{\beta}{1-\beta} g_{hh}(s,h)Q.$$

Search hours and expenditures will be decreasing in EI benefits in all other cases. The intuition is that credit constrained households presumably choose lower levels of search expenditures than they otherwise would. Relaxing the credit constraint allows them to choose a higher level of search expenditures — perhaps not the

unconstrained optimal value of search expenditures but close. Because search time and search expenditure are complements in the production function, individuals will spend more time on job search if they are also spending more money on job search. The relationship between EI benefits and the exit rate from unemployment to employment is ambiguous when search time and search expenditures are complements, it will depend on whether the effect of search intensity on the exit rate dominate the effect of reservation wages on the exit rate. In all other cases, the exit rate from unemployment is decreasing in EI benefits. I show these comparative statics in Appendix A.

4. Data

4.1 Employment Insurance Coverage Survey (EICS)

I use the Employment Insurance Coverage Survey (EICS) to study the relationship between EI benefits and job search intensity. The EICS is a cross-sectional survey in which approximately 11,000 unemployed individuals were interviewed in Canada between 1997 and 2012 (Statistics Canada 2014). Specifically, the EICS is a sub-sample individuals in the Labour Force Survey (LFS), a sample of individuals 15 years of age and older in Canada (Statistics Canada 2014). In my analysis, the samples are limited to those individuals who received EI benefits due to the survey design. I analyze the pooled cross-sections from all thirteen years; I also split the sample and perform separate analysis for 2000-2006, 2007-2009 and 2010-2012 to capture the relationships between EI receipt and search intensity before, during and after the recession.

The EICS data have advantages and disadvantages relative to other data used to study job search and employment insurance. The EICS contains measures of labor characteristics, EI benefit amounts, and the hours and costs of job search—a combination of variables not found in other surveys often used to study job search such as the American Time Use Surveys (ATUS) and the U.S. Current Population Survey (CPS). The disadvantage of EICS is the cross-sectional design, which does not allow the researcher to track individuals over time. Therefore, I cannot

identify the respondent's exit date from unemployment (and thus the duration of their unemployment spell).

The dependent variables in my study proxying for search intensity are hours spent looking for work and expenditures on job search. Specifically, the unemployed were asked, "How many hours did you spend on activities related to looking for work?" and "How much did it cost you to look for work?" The independent variable of interest is the weekly EI benefit amount. In addition to controlling for the survey year and province of residence, I also control for the characteristics of job seekers such as a proxy for their expected hourly wages, estimates of the dispersion of the wage distributions that they face, age, gender, province, highest education achieved, work experience, tenure, occupational categories, whether the respondent has children, whether the respondent was a full- or part-time worker prior to becoming unemployed, and whether the respondent was part of a labour union while in a prior position. All variables measured in dollars are expressed in terms of year 2000 dollars.

4.2 Survey of Labour and Income Dynamics (SLID)

I also use the Survey of Labour and Income Dynamics (SLID), which contains records for approximately 50,000 Canadian workers' weekly EI benefit amounts and unemployment durations, in order to examine how the exit rate from unemployment is related to the receipt of EI benefits. The SLID is a panel, which allows me to track employment status on a monthly basis within a calendar year. I use data from 2004 to 2011 to estimate a hazard model of the probability of exiting unemployment in which I allow the effects of EI benefits on the exit rate from unemployment to depend on whether the individual is unemployed before, during, or after the recession. I define 2004-2007 as the pre-recession period, 2008-2009 as the recession itself and 2010-2011 as the post-recession period. However, I am unable to track unemployed status across multiple years when using this data due to the survey design. Therefore, some observations are right-censored. In the hazard models, I control for the worker's age, province of residence, previous hourly wage and highest education achieved in addition to the receipt of EI benefits.

4.3 Descriptive Statistics of Job Search Activities and EI

Using the EICS, Figures 1 and 2 illustrate the distributions of search hours in my sample. More than three quarters of unemployed people spent less than 20 hours per week searching for jobs, which is consistent with Krueger & Mueller's (2010) findings in the United States. More than 95% of job searchers spent less than 100 Canadian dollars per week to search for jobs. Column 1 of table 1, which contains summary statistics for the EICS sample, reveals that the average number of hours spent on job search per week in Canada was 10.95, while the average job search expenditures per week were $25.79. Figure 3 compares the time devoted to jobs search in Canada against that in other countries as reported in Krueger & Mueller (2010). An unemployed Canadian worker devotes 101 minutes per day to job search, which is lower than the U.S. (160.4 minutes per day), but higher than some European countries with generous social welfare programs that likely reduce the incentive to search for work.

In the EICS, the average job search expenditures were slightly higher for men than for women, while the average number of hours spent on job search is considerably higher for women than for men. Specifically, women spent 1.27 hours on job search than men by receiving EI benefits—possibly because women were more likely to work part-time or leave the labour force for familial responsibilities and non-market activities in the period determining their benefits. Furthermore, women may not be eligible to receive EI because they do not satisfy the minimum number of working weeks the EI program required (Townson & Hayes, 2007). Therefore, for those women who received EI benefits have higher marginal value of EI benefits on search hours.

When splitting the sample by wealth. I classify households as "rich" or "poor" using four different categorization methods. First, does the individual receive some financial assistance from friends or relatives? Second, does the individual have sufficient household income to meet day-to-day expenses? Third, does the spouse or partner receive employment earnings? Finally, is she or he a single earner within a couple? Using these four questions, I split worker's households into two groups—loosely "rich" and "poor" households. The idea is to identify individuals in credit constrained households. Table 2 shows that job search

expenditures amounts are higher and EI benefits lower for poor people using the first two definitions of poor households.

5. Findings

5.1 Job Search and EI

I loosely follow the empirical strategy of Krueger and Mueller (2010) to assess the relationship between EI benefits and job search intensity. They estimate a wage equation controlling for worker characteristics to generate a predicted wage for each worker and the estimated residual wage dispersion for workers in a given state. They then use predicted wages to proxy for reservation wages and the residual wage dispersion to proxy for the variance of wage offer distribution. Following their approach, I estimate by OLS the following search intensity model:

$s_{ist} = \alpha + \beta_1 \log(EIB_{ist}) + \beta_2 \log(\hat{w}_{ist}) + \beta_3 std(resid.w)_s + \gamma X_i + d_t + \mu_{ist}$, where s_{ist} is job search intensity measured by time and money spent on a job search of unemployed *i* in province *s* at time *t*, EIB_{ist} is the weekly benefit amount, $\hat{w}_{ist}$ is the predicted wage, $std(resid.w)$ is the standard deviation of the residual wage, and d_t is a year effect. The controls X_i include age, gender, education, working experience, occupation, full-time or part-time status, whether being mother and whether the individual was previously in a labour union.

The OLS estimates in column 1 of Table 3 indicate that relationships between job search hours and expenditures and the EI benefit amount over all years in my samples are positive, which implies that search hours and expenditures are complements according to the comparative static predictions in section 3. Specifically, a 1% increase in EI benefits is associated with an estimated increases of 0.83 hours spent on job search and 15% in money spent on job search.

Columns 2 to 4 of Table 3 report the OLS estimates of the relationship between EI benefits and job search intensity during different periods. The estimates in panel A indicate that there were no significant differences in the relationship between EI benefits and job search hours before, during and after the

recession. The estimates in panel B, however, tell a different story. Specifically, the estimated elasticity of job search expenditures with respect to EI benefits is significantly larger during the recession than in other periods. There are no significant differences between the estimated elasticities of job search expenditures with respect to EI benefits before and after the recession.

5.2 Gender Differences in the Relationships between EI and Job Search

Table 4 reports the OLS estimates of the relationships between EI benefits and job search intensity separately for men and women. The estimates in column 1 of panel A indicate that the relationship between EI benefits and job search hours is larger for women than for men at a 10% significance level, while the relationship between EI benefits and job search expenditures is larger for men than for women, although the coefficients are not significantly different. The estimates imply that following a 1% increase in EI benefits, women increase their job search time by 1.5 hours per week while men increase their job search time by only 0.23 hours per week. Women may be constrained by domestic responsibilities that limit their ability to look for work. Extra EI benefits may afford such women the opportunity to, for example, hire babysitters and to otherwise substitute EI income for non-market production activities.

In addition to gender differences in the way men and women react to EI benefits, the recession appears to have affected the behavior of men and women differently. Columns 2 to 4 of table 4 present the OLS estimates of the relationships between EI benefits and search intensity before, during and after the recession for men. The coefficient is larger in the recession than in the pre-recession period and the post-recession period at the 1% and 5% significant level, respectively. A 1% increase in EI benefits is associated with an estimated 65% increase in money spent on job search during the recession, but only very small increases in spending on job search before and after the recession. Unemployed men may find themselves credit constrained during recessions in a way that affects their expenditures on job search. The receipt of EI benefits may relax this constraint; I discuss this more in the next section. Columns 6 to 8 show the estimated coefficients of EI benefits on search intensity before, during and after the recession for women, but I observe no statistically significant differences. EI

benefits are associated with longer search hours among women regardless of the macroeconomic conditions.

5.3 Wealth Differences in the Relationship between Job Search and EI

Tables 5 and 6 report the OLS coefficient estimates for the log EI benefit amounts in the job search hours and job search cost regressions, respectively, for "rich" and "poor" households using different wealth categorization schemes. The coefficients for poor people are significant and bigger than the coefficients for rich people in most specifications. Defining poor households to be those who receive assistance from friends and relatives, I find that a 1% increase in EI benefits is associated with 10.5 hours more time spent on job search per week in such household, which is 20.7% higher than in households not receiving money from friends and relatives. Likewise, I estimate that a 10 percent increase in EI benefits among individuals in households receiving money from friends and relatives would be associated with a 3.7 percent increase in spending on job search—an estimate that is 3.7 times higher than that for wealthy people.

Defining poor households to be those who do not have enough money to meet day-to-day expenses, I find that a 1% increase in EI benefits is associated with 1.65 hours more time spent on job search per week in such household, which is 1.69 hours higher than in households that have enough money to meet day-to-day expenses. Likewise, I estimate that a 10 percent increase in EI benefits among individuals in households without enough money to meet day-to-day expenses would be associated with a 2.0 percent increase in spending on job search.

5.4 Job Search and the Endogeneity of EI Benefits

The positive correlation between EI benefits and job search intensity could arise because of unobserved individual characteristics related to search behaviors that are also correlated with EI benefits. For example, individuals with higher earnings or higher labor force attachment prior to becoming unemployment are likely to receive more EI benefits and also likely to spend more resources on job search since unemployment is more costly in terms of foregone earnings for them than for individuals with lower earnings or lower labor force attachment. In such a situation, the effect of EI benefits on job search intensity is likely overestimated using OLS.

I take two approaches to deal with this endogeneity. First, I make a conditional independence assumption (CIA). That is, I assume that by controlling for worker characteristics such as the estimated reservation wage, the unobservables comprising the econometric error term are uncorrelated with the EI benefits received. Under this assumption, my OLS estimates are unbiased estimates of the causal effect of EI benefits on search intensity.

Because the conditional independence assumption is unlikely to hold in practice, I also instrument for the EI benefits received using the average weekly EI benefits in my data for respondents in the same year, in the same province, with the same level of education, and the same gender as the respondent and use two-stage least square model (2SLS) to estimate the relationship between EI benefits and job search intensity. The F statistic for the significance of the instrument is considerably larger than the rule of thumb value of 10 suggested by many, so I conclude that the log of average EI benefits for similar individuals is not a weak instrument EI benefits. Table 7 reports that IV coefficients between the log of EI benefits and search expenditures are positive from 2000 to 2012 at the 5% significant level. The association is the strongest during the recession. Specifically, the estimated elasticity of job search expenditures with respect to EI benefits is significantly larger (at the 5% level) during the recession than in other periods. A 1% increase in EI benefits is associated with an estimated 94% increase in money spent on job search during the recession, but only very small increases in spending on job search before and after the recession. The results are consistent with OLS estimates but considerably less precise.

Columns 2 to 4 of table 8 present the coefficients of EI benefits on search hours for women. During the recession, this coefficient estimate is larger than in the pre-recession period and the post-recession period. A 1% increase in EI benefits is associated with an estimated 5.48 hours increase in time spent on job search during the recession, but only very small increases in spending on job search before and after the recession. The estimated elasticity of job search expenditures with respect to EI benefits is significantly larger (at the 5% and 1% level) during the recession than in other periods. The results are consistent with OLS estimate but much less precise owing to the relatively small samples and the use of an instrument. The 2SLS estimates in tables 9 and 10 show little evidence

that the poor exert more search effort than the rich, but again the IV estimates are very imprecise in these small samples.

5.5 Hazard Model of the Probability of Exiting Unemployment

Figure 4 shows the estimated exit rates from unemployment over the course of an unemployment spell for the periods before, during and after the recession in the SLID data. The predicted exit rates from unemployment for periods during and after the recession are lower than for the period before the recession. After the financial crisis began, EI recipients were more likely to find jobs and exit unemployment than non-EI recipients. I caution against a causal interpretation, however, because non-EI recipients may be very different on unobserved levels than EI recipients and these differences may be more consequential in terms of finding employment during an economic downturn.

I estimate the relationship between EI receipt (measured in a binary fashion) and the exit rate from unemployment to employment using a Cox proportional hazard model. The main object of interest is the estimated hazard ratio; these hazard ratios (reported in table 11) are positive in all three periods. People who receive EI benefits have lower exit rates from unemployment than non-recipients, which implies longer unemployment duration for EI recipients. This is consistent with Ham and Rea (1986), Meyer and Katz (1988), and Meyer's (1990) prediction of a positive relationship between EI benefits and unemployment duration. Specifically, the exit rate for EI recipients is 89% of non-recipients' during the recession. Furthermore, panel B shows the ratio of exit rate during the recession is significantly higher than the period before the recession at the 5% level compared to non-recipients. The intuition is that EI benefit tends to lengthen unemployment spells but to a lesser extent during recessions. EI increases the value of remaining unemployed and thereby increases reservation wage. The higher reservation wage provides incentives to remain unemployed longer. But during recession, the negative effect of EI benefits on exit rate from unemployment is smaller. This might be a result of an increase in the job search intensity of EI recipients during the recession, which is consistent with the first part of my study.

There may be some unobserved labor characteristics that affect the behaviours on job search and correlated with unemployment duration among EI recipients

and non-EI recipients. As a result, the Cox proportional hazard model estimates could be biased. I use the grouped hazard single risk duration model with gamma distributed frailty to address the unobserved heterogeneity. Table 12 reports that the hazard ratio is less than 1 in all periods, which implies EI recipients experience longer unemployment duration than non-recipients. Furthermore, the ratio of exit rate during the recession is significantly higher than the period before the recession at the 10% level compared to non-recipients. The results are consistent with Cox proportional hazard model estimates.

6. Policies

The existing EI program may fail to distribute benefits to the groups that would benefit from them the most and at the times when EI benefits would have the greatest effect. Specifically, EI benefits appear to lead to more time spent searching for work among women and more time spent looking for work among individuals from poorer households. If we assume that my estimates capture the causal effects of EI benefits on search intensity, then the marginal impact of a dollar spent on EI benefits will be greater among women and poorer households. If the policy-maker's objective is to get people to search more to return them to work faster, then spending more money on EI benefits for women and people from poor households will be optimal assuming that the effect of EI benefits on search intensity outweighs any competing effects on reservation wages.

During the recession, the U.S. government's extension of the duration of EI benefits from 26 weeks to 46 weeks had a significant positive impact on smoothing consumption and overcoming the financial crisis (Rothstein 2011). By contrast, the EI program in Canada did not respond to changes in the economic environment. Assuming my findings are causal estimates would suggest that EI benefits have a bigger effect on search intensity during recessions than during other periods. Therefore, the government could consider changing the EI program to respond to changes in macroeconomic conditions. Specifically, EI benefits could be ratcheted up during economic downturns to speed the return to work of the unemployed.

7. Conclusion

In this paper, I present new evidence on the relationship between job search intensity and employment insurance using a nationally representative dataset of Canada's unemployed. I measure job search intensity using search hours and search expenditures and find that both hours and money spent on job search activities are significantly positively related to EI benefits from 2000 to 2012 based. I also find that the estimated relationship between EI benefits and search hours is higher for women than for men and that people with less wealth generally search more intensively when receiving EI benefits than other individuals. The relationships between EI benefits and both job search time and job search expenditures are higher during the recent financial crisis than during other periods. To address the potential endogeneity of EI benefits, I instrument for EI benefits using the average weekly EI benefits of similar individuals. My 2SLS estimates are broadly similar to those obtained through OLS: individuals exert more effort on job search when receiving EI during the recession than during other periods. My findings are inconsistent with Krueger and Mueller's (2010) study that estimates a negative correlation between EI benefits and search intensity.

My findings suggest that EI policy-makers might provide more benefits to women and the poor or increase the benefit ratio or the length of the benefit duration to speed their return to work. Policymakers could also increase EI benefits in response to recessions in order to put more Canadians back to work.

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Appendix A

Figure 1: Kernel Density Curve of Hours Spent on Job Search

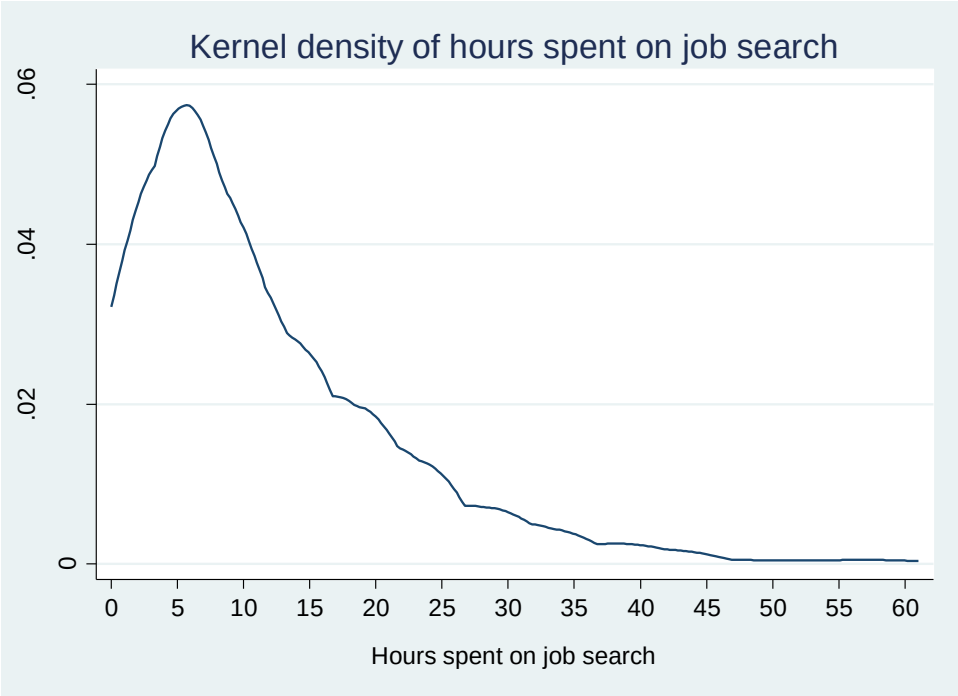


Figure 2: Kernel Density Curves of Job Search Expenditures

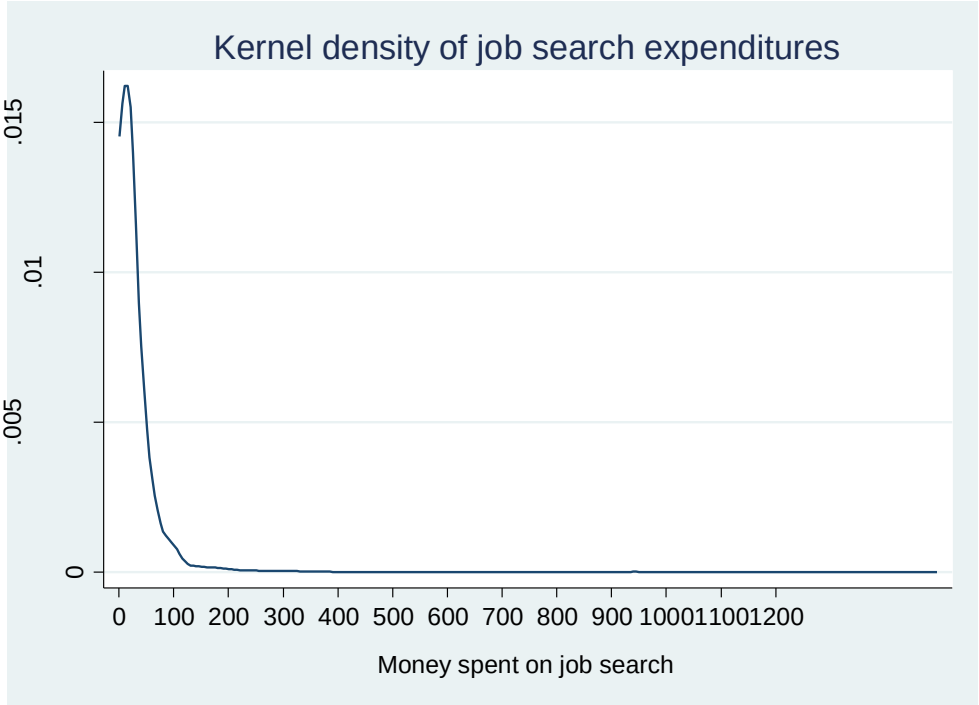
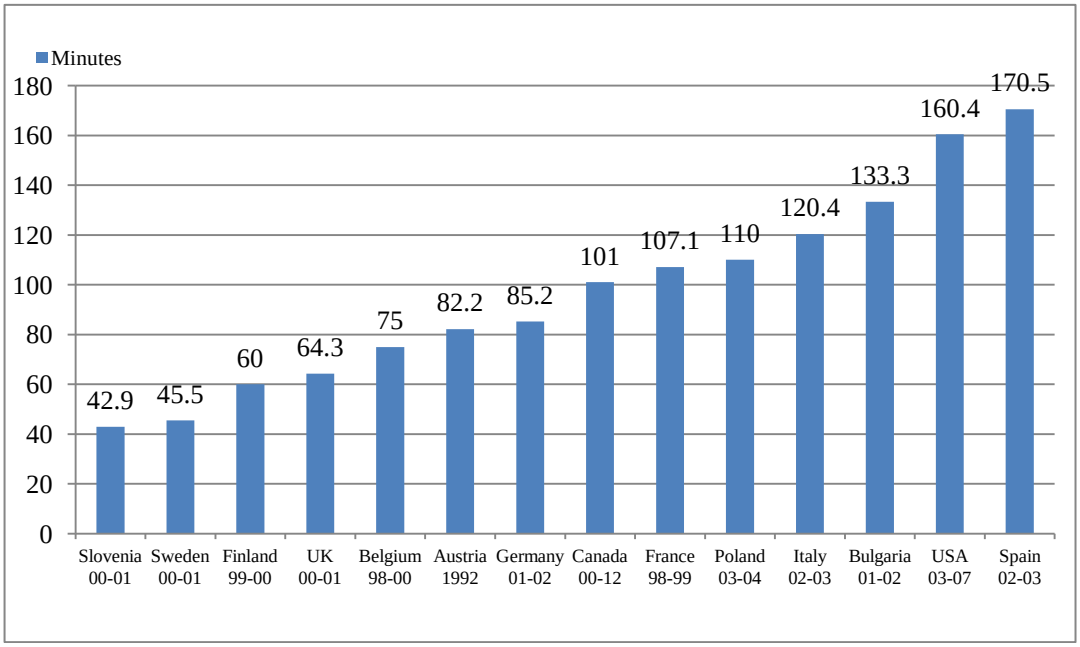


Figure 3: Average Minutes per Day Spent on Unemployed Job Search



Source: Krueger and Mueller (2010)

Figure 4: Hazard Ratios

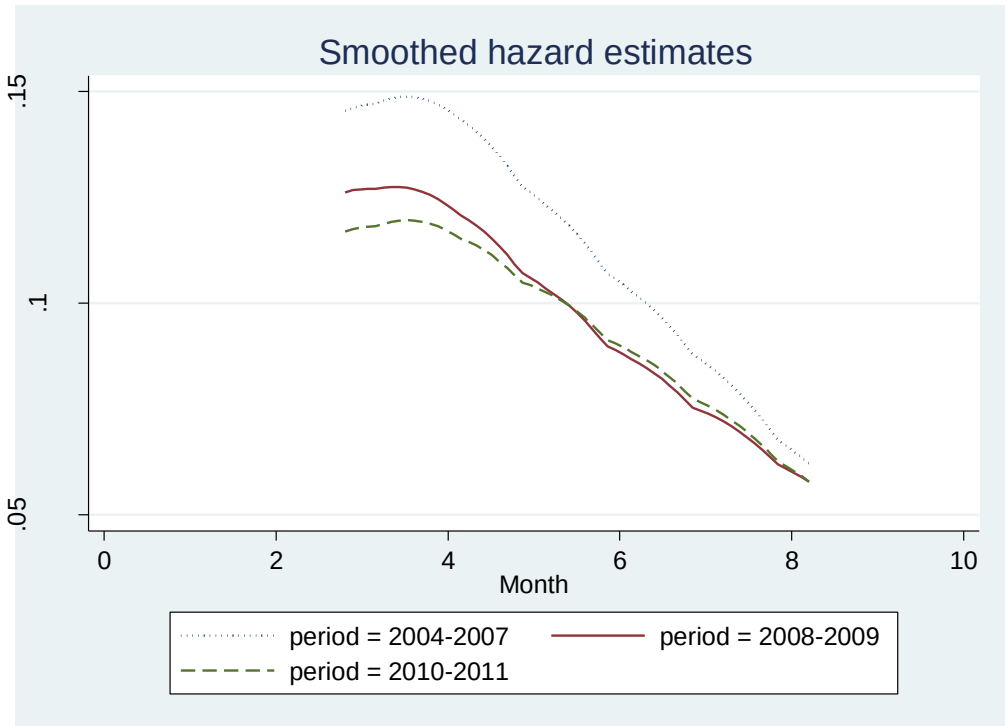


Table 1: Summary Statistics for Gender Subgroups (2000-2012)

Variable	All	Men	Women
Search Hours	11.11	11.67	10.35
	(9.77)	(10.21)	(9.08)
Search Expenditures	36.16	30.60	20.09
	(57.54)	(62.51)	(49.33)
EI Benefit	298.22	323.16	264.12
	(95.43)	(8757)	(95.2)
Province			
Atlantic region	0.38	0.37	0.39
Quebec	0.23	0.24	0.22
Ontario	0.20	0.20	0.21
Manitoba &Saskatchewan	0.07	0.08	0.06
Alberta	0.05	0.05	0.05
British Columbia	0.07	0.07	0.07
Age (%)	0.00	0.00	0.00
15-24	0.10	0.11	0.07
25-44	0.48	0.47	0.51
> 44	0.42	0.42	0.42
Education	0.00	0.00	0.00
≤ Grade8	0.05	0.06	0.04
Grade 9-13	0.16	0.18	0.14
Grade 11-13	0.21	0.20	0.22
Post-graduate	0.08	0.07	0.08
Below Bachelor's	0.39	0.39	0.39
University graduate	0.10	0.09	0.12
Mother Yes	0.02	0.00	0.04
Union Yes	0.23	0.28	0.17
Full-time	0.12	0.06	0.20
Part-time	0.88	0.94	0.80
Last work tenure	0.00	0.00	0.00
≤ 1months	0.03	0.03	0.03
1-3 months	0.16	0.17	0.14
4-6 months	0.16	0.16	0.15
7-12 months	0.13	0.13	0.13
13-24 months	0.12	0.12	0.13
24-60 months	0.17	0.16	0.18
6-10 years	0.10	0.10	0.11
11-20 years	0.08	0.07	0.08
≥ 21 years	0.04	0.05	0.04
Occupation	0.00	0.00	0.00
Agriculture & forestry, fishing, mining, oil and gas	0.11	0.15	0.06
Construction	0.14	0.22	0.03
Manufacturing	0.18	0.20	0.15
Retail trade & accommodation and food services	0.16	0.10	0.25
Educational services & health care and social assistance & public administration	0.13	0.07	0.21
All others	0.28	0.27	0.30
Number of observations	6942	4011	2931

Note: Standard deviation in parentheses for continuous variables. The remaining variables are categorical indicator variables. The table provides the percentage of the sample in each category. The sample consists of observations from 6,942 workers.

Table 2: Summary Statistics for Wealth Subgroups (2000-2012)

	Definition 1		Definition 2		Definition 3		Definition 4	
Variable	Rich	Poor	Rich	Poor	Rich	Poor	Rich	Poor
Search Hours	10.85	13.41	9.76	12.12	11.01	11.1	10.97	11.23
	(9.66)	(10.53)	(8.98)	(10.25)	(9.69)	(9.79)	(9.68)	(9.84)
Search Expenditures	24.94	35.44	20.53	30.02	26.21	26.26	26.37	26.24
	(54.57)	(83.32)	(49.61)	(63.31)	(58.11)	(58.11)	(60.93)	(54.79)
EI Benefit	266.17	251.28	266.06	262.39	267.05	258.72	263.37	290.91
	(80.67)	(81.81)	(78.74)	(82.67)	(81.81)	(80.67)	(81.59)	(80.52)
Province								
Atlantic region	0.38	0.33	0.38	0.38	0.35	0.40	0.37	0.39
Quebec	0.24	0.16	0.28	0.20	0.23	0.23	0.23	0.25
Ontario	0.20	0.27	0.17	0.23	0.23	0.18	0.22	0.18
Manitoba & Saskatchewan	0.07	0.10	0.07	0.07	0.08	0.07	0.08	0.07
Alberta	0.05	0.06	0.04	0.05	0.05	0.05	0.05	0.04
British Columbia	0.07	0.08	0.06	0.08	0.06	0.07	0.06	0.07
Age								
15-24	0.05	0.07	0.07	0.06	0.03	0.14	0.11	0.08
25-44	0.47	0.66	0.44	0.53	0.52	0.45	0.51	0.44
> 44	0.48	0.26	0.49	0.41	0.44	0.41	0.38	0.47
Education	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
≤ Grade8	0.06	0.02	0.06	0.05	0.04	0.06	0.04	0.07
Grade 9-13	0.17	0.15	0.16	0.16	0.14	0.18	0.15	0.18
Grade 11-13	0.21	0.20	0.21	0.21	0.21	0.21	0.22	0.20
Post-graduate	0.07	0.10	0.06	0.08	0.07	0.08	0.07	0.08
Below Bachelor's	0.39	0.42	0.39	0.40	0.41	0.38	0.40	0.39
University graduate	0.10	0.11	0.11	0.10	0.13	0.09	0.13	0.08
Mother Yes	0.05	0.02	0.01	0.02	0.03	0.01	0.01	0.02
Union Yes	0.24	0.21	0.25	0.23	0.24	0.23	0.23	0.24
Full-time	0.12	0.11	0.13	0.11	0.13	0.11	0.13	0.10
Part-time	0.88	0.89	0.87	0.89	0.87	0.89	0.87	0.90
Last work tenure								
≤ 1months	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03
1-3 months	0.15	0.17	0.16	0.15	0.14	0.17	0.16	0.16
4-6 months	0.15	0.15	0.16	0.15	0.14	0.17	0.15	0.17
7-12 months	0.12	0.15	0.12	0.13	0.13	0.13	0.13	0.13
13-24 months	0.12	0.14	0.12	0.13	0.13	0.12	0.13	0.12
24-60 months	0.17	0.20	0.16	0.18	0.18	0.17	0.18	0.17
6-10 years	0.11	0.09	0.11	0.11	0.11	0.10	0.10	0.10
11-20 years	0.09	0.05	0.09	0.08	0.09	0.07	0.08	0.08
≥ 21 years	0.05	0.02	0.05	0.04	0.04	0.04	0.04	0.05
Occupation								
Agriculture & forestry, fishing, mining, oil gas	0.11	0.09	0.11	0.11	0.09	0.12	0.11	0.11
Construction	0.14	0.11	0.14	0.14	0.13	0.15	0.14	0.15
Manufacturing	0.18	0.19	0.17	0.19	0.17	0.19	0.17	0.19
Retail trade & accommodation and food services	0.16	0.18	0.16	0.16	0.16	0.16	0.17	0.16
Educational services & health care and social assistance administration	0.13	0.12	0.14	0.12	0.14	0.11	0.13	0.11
All others	0.28	0.31	0.28	0.28	0.29	0.27	0.28	0.28
Number of observations	5526	756	2605	3913	2787	3947	3657	2808

Note: Standard deviation in parentheses. Definition 1: Whether unemployed received some financial assistance from friends or relatives. Definition 2: Whether unemployed has sufficient household income to meet day-to-day expenses. Definition 3: Whether spouse or partner received employment earnings. Definition 4: Whether unemployed are a single earner couple and non-earner couple.

Table 3: Job Search Intensity

Year	2000-2012	2000-2006	2007-2009	2010-2012
	(1)	(2)	(3)	(4)
Panel A. Job Search Hours				
Log EI Benefit	0.84*	1.09*[a]	0.49[b]	0.84[c]
	(0.46)	(0.64)	(1.09)	(0.77)
R^2	0.10	0.11	0.12	0.12
Number of observations	6942	3806	1562	1574
Panel B. Log Job Search Expenditures				
Log EI Benefit	0.15**	0.14[d]	0.44**[e]	-0.01[f]
	(0.08)	(0.10)	(0.18)	(0.13)
R^2	0.06	0.05	0.07	0.05
Number of observations	6942	3806	1562	1574
Panel C. Equality Coefficient Test				
p-value	a-b	0.93	d-e	0.03**
	b-c	0.96	e-f	0.01**
	a-c	0.90	d-f	0.49

* *significant at the* 10% level, ** *significant at the* 5% level, *** *significant at the* 1% level.

Note: Robust standard errors in parentheses. The remaining controls include expected wage, standard deviation of the residual wage, age, province, education level, work tenure, full- or part-time status, whether one is part of a union, occupation, year effect and province effect. The occupation controls include five indicators for broad occupational categories. All variables measured in dollars are adjusted to the year 2000 level of inflation.

Table 4: Gender and Job Search Intensity

Year	Men 2000-2012	2000-2006	2007-2009	2010-2012	Women 2000-2012	2000-2006	2007-2009	2010-2012
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Panel A. Job Search Hours								
Log EI Benefit	0.23	0.71[a]	-0.56[b]	0.63[c]	1.50***	1.54*[d]	2.25**[e]	0.87[f]
	(0.69)	(0.92)	(1.60)	(1.12)	(0.56)	(0.88)	(1.15)	(0.96)
R^2	0.11	0.12	0.13	0.14	0.11	0.13	0.19	0.16
Number of observations	4011	2178	958	875	2931	1628	604	699
Panel B. Log Job Search Expenditures								
Log EI Benefit	0.160	0.13[g]	0.65***[h]	-0.10[i]	0.11	0.08[j]	0.03[k]	0.14[l]
	(0.11)	(0.15)	(0.24)	(0.18)	(0.10)	(0.14)	(0.25)	(0.19)
R^2	0.04	0.05	0.07	0.05	0.06	0.06	0.09	0.09
Number of observations	4011	2178	958	875	2931	1628	604	699
Panel C. Equality Coefficient Test								
p-value	a-b	0.73	d-e	0.36	g-h	0.002***	j-k	0.74
	b-c	0.81	e-f	0.37	h-i	0.01**	k-l	0.78
	a-c	0.83	d-f	0.84	g-i	0.31	j-l	0.99

* *significant at the* 10% level, ** *significant at the* 5% level, *** *significant at the* 1% level.

Note: Robust standard errors in parentheses. The remaining controls include expected wage, standard deviation of the residual wage, age, province, education level, work tenure, full- or part-time status, whether one is part of a union, occupation, year effect and province effect. The occupation controls include five indicators for broad occupational categories. All variables measured in dollars are adjusted to the year 2000 level of inflation.

Table 5: Wealth and Job Search Hours

	Poor				Rich			
Year	2000-2012	2000-2006	2007-2009	2010-2012	2000-2012	2000-2006	2007-2009	2010-2012
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Definition 1: Whether unemployed received some financial assistance from friends or relatives								
Log EI Benefit	1.04	0.70[a]	2.60[b]	1.11[c]	0.90*	1.16[d]	-0.23[e]	1.51*[f]
	(1.30)	(1.92)	(2.62)	(2.85)	(0.53)	(0.76)	(1.19)	(0.81)
R^2	0.14	0.18	0.31	0.30	0.11	0.12	0.13	0.13
Number of observations	756	371	178	207	5526	2989	1270	1267
Definition 2: Whether unemployed has sufficient household income to meet day-to-day expenses								
Log EI Benefit	1.66***	2.39***[g]	-0.25[h]	2.17*[i]	-0.05	-1.25[j]	2.12[k]	0.001[l]
	(0.63)	(0.86)	(1.28)	(1.11)	(0.75)	(1.13)	(1.82)	(1.10)
R^2	0.11	0.12	0.14	0.14	0.12	0.13	0.21	0.17
Number of observations	3913	2253	815	845	2605	1295	655	655
Definition 3: Whether spouse or partner received employment earnings								
Log EI Benefit	0.83	1.18[m]	1.92*[n]	0.34[o]	0.96	1.40[p]	-1.91[q]	1.84[r]
	(0.55)	(0.79)	(1.13)	(0.87)	(0.80)	(1.07)	(1.56)	(1.22)
R^2	0.10	0.12	0.13	0.15	0.13	0.13	0.17	0.19
Number of observations	3947	2275	921	751	2787	1518	640	629
Definition 4: Whether unemployed is single earner couple and non-earner couple								
Log EI Benefit	1.06	0.59[s]	3.02**[t]	1.43[u]	0.47	0.97[v]	-1.29[w]	0.36[x]
	(0.68)	(1.01)	(1.52)	(1.04)	(0.67)	(0.86)	(1.37)	(1.24)
R^2	0.11	0.13	0.17	0.17	0.12	0.12	0.15	0.19
Number of observations	2808	1515	672	621	3657	2409	807	801
Equality Coefficient Test								
p-value	a-b	0.36	g-h	0.14	m-n	0.05*	s-t	0.03**
	b-c	0.81	h-i	0.22	n-o	0.09*	t-u	0.06*
	a-c	0.20	g-i	0.85	m-o	0.66	s-u	0.88
	d-e	0.49	j-k	0.06*	p-q	0.05*	v-w	0.24
	e-f	.018	k-l	0.15	q-r	0.04**	w-x	0.24
	d-f	0.72	j-l	0.55	p-r	0.67	v-x	0.97

* *significant at the* 10% level, ** *significant at the* 5% level, *** *significant at the* 1% level.

Note: Robust standard errors in parentheses. The remaining controls include expected wage, standard deviation of the residual wage, age, province, education level, work tenure, full- or part-time status, whether one is part of a union, occupation, year effect and province effect. The occupation controls include five indicators for broad occupational categories. All variables measured in dollars are adjusted to the year 2000 level of inflation.

Table 6: Wealth and Job Search Expenditures

	Poor				Rich			
Year	2000-2012	2000-2006	2007-2009	2010-2012	2000-2012	2000-2006	2007-2009	2010-2012
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Definition 1: Whether unemployed received some financial assistance from friends or relatives								
Log EI Benefit	0.38*	0.59**	1.01**	-0.08	0.11	0.04	0.28	0.08
	(0.22)	(0.25)	(0.43)	(0.55)	(0.08)	(0.12)	(0.20)	(0.14)
R^2	0.15	0.33	0.20	0.32	0.06	0.06	0.09	0.06
Number of observations	756	371	178	207	5526	2989	1270	1267
Definition 2: Whether unemployed has sufficient household income to meet day-to-day expenses								
Log EI Benefit	0.20**	0.180	0.48**	-0.002	0.09	-0.07	0.38	0.12
	(0.06)	(0.13)	(0.22)	(0.17)	(0.07)	(0.16)	(0.31)	(0.22)
R^2	0.07	0.08	0.12	0.08	0.06	0.08	0.12	0.08
Number of observations	3913	2253	815	845	2605	1295	655	655
Definition 3: Whether spouse or partner received employment earnings								
Log EI Benefit	0.19*	0.16	0.48*	0.16	0.09	0.14	0.44*	-0.152
	(0.10)	(0.13)	(0.26)	(0.19)	(0.12)	(0.17)	(0.23)	(0.25)
R^2	0.06	0.06	0.09	0.09	0.08	0.08	0.14	0.11
Number of observations	3947	2275	921	751	2787	1518	640	629
Definition 4: Whether unemployed is a single earner couple and non-earner couple								
Log EI Benefit	0.19*	-0.08	0.25	0.47**	0.08	0.19	0.63***	-0.16
	(0.11)	(0.15)	(0.29)	(0.18)	(0.12)	(0.14)	(0.22)	(0.21)
R^2	0.07	0.08	0.13	0.15	0.08	0.08	0.10	0.07
Number of observations	2808	1515	621	672	3657	2409	807	801
Equality Coefficient Test								
p-value	a-b	0.19	g-h	0.08*	m-n	0.19	s-t	0.046**
	b-c	0.32	h-i	0.09*	n-o	0.14	t-u	0.37
	a-c	0.97	g-i	0.83	m-o	0.55	s-u	0.21
	d-e	0.17	j-k	0.20	p-q	0.33	v-w	0.05**
	e-f	0.67	k-l	0.22	q-r	0.14	w-x	0.005***
	d-f	0.91	j-l	0.94	p-r	0.44	v-x	0.17

* *significant at the* 10% level, ** *significant at the* 5% level, *** *significant at the* 1% level.

Note: Robust standard errors in parentheses. The remaining controls include expected wage, standard deviation of the residual wage, age, province, education level, work tenure, full- or part-time status, whether one is part of a union, occupation, year effect and province effect. The occupation controls include five indicators for broad occupational categories. All variables measured in dollars are adjusted to the year 2000 level of inflation.

Table 7: Job Search Intensity with IV

Year	2000-2012	2000-2006	2007-2009	2010-2012
	(1)	(2)	(3)	(4)
Panel A. Job Search Hours				
First Stage				
Log Average EI benefit	0.95	0.89	0.96	1.18
	(0.67)	(0.09)	(0.12)	(0.19)
R^2	0.34	0.36	0.31	0.28
Second Stage				
Log EI Benefit	0.83	0.36[a]	3.74[b]	-1.12[c]
	(1.62)	(2.53)	(2.80)	(2.42)
R^2	0.10	0.11	0.11	0.12
Number of observations	6942	3806	1562	1574
Panel B. Log Job Search Expenditures				
First Stage				
Log Average EI benefit	0.95	0.89	0.96	1.18
	(0.67)	(0.09)	(0.12)	(0.19)
R^2	0.34	0.36	0.31	0.28
Second Stage				
Log EI Benefit	0.46*	0.64*[d]	0.92*[e]	-0.21[f]
	(0.26)	(0.39)	(0.56)	(0.50)
R^2	0.05	0.04	0.06	0.05
Number of observations	6942	3806	1562	1574
Panel C. Equality Coefficient Test				
p-value	a-b	0.93	d-e	0.06*
	b-c	0.99	e-f	0.03**
	a-c	0.92	d-f	0.48

[*] *significant at the* 10% level, [**] *significant at the* 5% level, [***] *significant at the* 1% level.
Note: Robust standard errors in parentheses. First stage and second stage coefficients are estimated from 2SLS model. The remaining controls include expected wage, standard deviation of the residual wage, age, province, education level, work tenure, full- or part-time status, whether one is part of a union, occupation, year effect and province effect. The occupation controls include five indicators for broad occupational categories. All variables measured in dollars are adjusted to the year 2000 level of inflation.

Table 8: Gender and Job Search Intensity with IV

Year	Men 2000-2012	2000-2006	2007-2009	2010-2012	Women 2000-2012	2000-2006	2007-2009	2010-2012
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Panel A. Job Search Hours								
First Stage								
Log Average EI benefit	1.04	0.98	1.15	1.16	0.89	0.80	0.87	1.12
	(0.10)	(3.59)	(0.15)	(0.29)	(0.90)	(0.12)	(0.16)	(0.20)
R^2	0.29	0.31	0.29	0.23	0.31	0.33	0.35	0.28
Second Stage								
Log EI Benefit	-0.95	-1.95[a]	1.14[b]	-1.44[c]	0.81	1.76[d]	5.48**[e]	-2.26[f]
	(2.58)	(3.59)	(5.28)	(3.96)	(2.26)	(4.00)	(2.61)	(3.40)
R^2	0.11	0.11	0.12	0.13	0.11	0.12	0.17	0.14
Number of observations	4011	2178	958	875	2931	1628	604	699
Panel B. Log Job Search Expenditures								
First Stage								
Log Average EI benefit	1.04	0.98	1.15	1.16	0.89	0.80	0.87	1.12
	(0.10)	(3.59)	(0.15)	(0.29)	(0.90)	(0.12)	(0.16)	(0.20)
R^2	0.29	0.31	0.29	0.23	0.31	0.33	0.35	0.28
Second Stage								
Log EI Benefit	0.40	0.65[g]	0.94[h]	0.21[i]	0.39	0.42[j]	0.78[k]	-1.09[l]
	(0.41)	(0.57)	(0.85)	(0.71)	(0.36)	(0.53)	(0.71)	(0.77)
R^2	0.04	0.04	0.07	0.05	0.06	0.05	0.07	0.01
Number of observations	4011	2178	958	875	2931	1628	604	699
Panel C. Equality Coefficient Test								
p-value	a-b	0.68	d-e	0.47	g-h	0.03**	j-k	0.88
	b-c	0.65	e-f	0.40	h-i	0.003***	k-l	0.98
	a-c	0.91	d-f	0.87	g-i	0.20	j-l	0.88

* *significant at the* 10% level, ** *significant at the* 5% level, *** *significant at the* 1% level.

Note: Robust standard errors in parentheses. First stage and second stage coefficients are estimated from 2SLS model. The remaining controls include expected wage, standard deviation of the residual wage, age, province, education level, work tenure, full- or part-time status, whether one is part of a union, occupation, year effect and province effect. The occupation controls include five indicators for broad occupational categories. All variables measured in dollars are adjusted to the year 2000 level of inflation.

Table 9: Wealth and Job Search Hours with IV

Year	Poor 2000-2012	2000-2006	2007-2009	2010-2012	Rich 2000-2012	2000-2006	2007-2009	2010-2012
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Definition 1: Whether unemployed received some financial assistance from friends or relatives								
First Stage								
Log Average EI benefit	0.96	0.93	0.90	0.93	0.97	0.93	1.01	1.13
	(0.04)	(0.05)	(0.09)	(0.10)	(0.07)	(0.09)	(0.16)	(0.20)
R^2	0.64	0.73	0.65	0.47	0.33	0.38	0.33	0.30
Second Stage								
Log EI Benefit	0.76	1.91	1.59	5.53	0.62	-1.60	1.26	3.58
	(2.03)	(4.07)	(4.07)	(5.41)	(1.69)	(2.52)	(2.85)	(2.69)
R^2	0.14	0.31	0.31	0.29	0.11	0.12	0.13	0.12
Number of observations	756	371	178	207	5526	2989	1270	1267
Definition 2: Whether unemployed has sufficient household income to meet day-to-day expenses								
First Stage								
Log Average EI benefit	0.99	0.92	1.15	1.11	0.94	0.92	0.87	1.09
	(0.08)	(0.09)	(0.16)	(0.23)	(0.04)	(0.05)	(0.11)	(0.14)
R^2	0.37	0.41	0.38	0.34	0.43	0.51	0.45	0.35
Second Stage								
Log EI Benefit	0.48	1.30	-0.99	1.64	0.13	-2.29	2.98	5.03
	(1.70)	(2.44)	(3.17)	(2.98)	(1.49)	(1.82)	(3.45)	(3.62)
R^2	0.11	0.12	0.14	0.14	0.12	0.13	0.21	0.14
Number of observations	3913	2253	815	845	2605	1295	655	655
Definition 3: Whether spouse or partner received employment earnings								
First Stage								
Log Average EI benefit	1.06	0.96	1.06	1.33	0.98	1.02	0.80	1.12
	(0.07)	(0.05)	(0.16)	(0.24)	(0.07)	(0.07)	(0.12)	(0.16)
R^2	0.38	0.42	0.35	0.36	0.40	0.49	0.41	0.33
Second Stage								
Log EI Benefit	1.25	4.04	-0.85	0.29	0.89	-1.30	2.61	2.33
	(1.43)	(1.99)	(3.16)	(2.29)	(2.04)	(2.72)	(3.51)	(3.73)
R^2	0.10	0.11	0.13	0.15	0.13	0.12	0.15	0.19
Number of observations	3947	2275	921	751	2787	1518	640	629
Definition 4: Whether unemployed is single earner couple and non-earner couple								
First Stage								
Log Average EI benefit	1.01	0.97	0.99	1.13	0.95	0.97	0.82	1.11
	(0.06)	(0.05)	(0.09)	(0.19)	(0.06)	(0.07)	(0.10)	(0.15)
R^2	0.42	0.45	0.48	0.41	0.35	0.40	0.34	0.33
Second Stage								
Log EI Benefit	0.26	3.34	-1.65	0.05	0.97	-0.28	3.81	-1.32
	(1.46)	(2.10)	(2.38)	(2.82)	(1.88)	(2.52)	(3.25)	(3.16)
R^2	0.11	0.12	0.15	0.17	0.12	0.12	0.12	0.19
Number of observations	2808	1515	672	621	3657	2409	807	801

[*] *significant at the* 10% level, [**] *significant at the* 5% level, [***] *significant at the* 1% level.

Note: Robust standard errors in parentheses. First stage and second stage coefficients are estimated from 2SLS model. The remaining controls include expected wage, standard deviation of the residual wage, age, province, education level, work tenure, full- or part-time status, whether one is part of a union, occupation, year effect and province effect. The occupation controls include five indicators for broad occupational categories. All variables measured in dollars are adjusted to the year 2000 level of inflation.

Table 10: Wealth and Job Search Expenditures with IV

	Poor				Rich			
Year	2000-2012 (1)	2000-2006 (2)	2007-2009 (3)	2010-2012 (4)	2000-2012 (5)	2000-2006 (6)	2007-2009 (7)	2010-2012 (8)
Definition 1: Whether unemployed received some financial assistance from friends or relatives								
First Stage								
Log Average EI benefit	0.96	0.93	0.90	0.93	0.97	0.93	1.01	1.13
	(0.04)	(0.05)	(0.09)	(0.10)	(0.07)	(0.09)	(0.16)	(0.20)
R^2	0.64	0.73	0.65	0.47	0.33	0.38	0.33	0.30
Second Stage								
Log EI Benefit	-0.17	0.50	0.003	-1.12	0.13	0.22	-0.18	0.19
	(0.30)	(0.32)	(0.73)	(0.84)	(0.26)	(0.35)	(0.49)	(0.50)
R^2	0.14	0.33	0.17	0.30	0.06	0.06	0.08	0.06
Number of observations	756	371	178	207	5526	2989	1270	1267
Definition 2: Whether unemployed has sufficient household income to meet day-to-day expenses								
First Stage								
Log Average EI benefit	0.99	0.92	1.15	1.11	0.94	0.92	0.87	1.09
	(0.08)	(0.09)	(0.16)	(0.23)	(0.04)	(0.05)	(0.11)	(0.14)
R^2	0.37	0.41	0.38	0.34	0.43	0.51	0.45	0.35
Second Stage								
Log EI Benefit	0.29	0.38	0.90	-0.32	0.22	0.19	0.23	0.73
	(0.27)	(0.38)	(1.12)	(0.53)	(0.28)	(0.34)	(0.68)	(0.58)
R^2	0.07	0.07	0.11	0.08	0.06	0.07	0.12	0.06
Number of observations	3913	2253	815	845	2605	1295	655	655
Definition 3: Whether spouse or partner received employment earnings								
First Stage								
Log Average EI benefit	1.06	0.96	1.06	1.33	0.98	1.02	0.80	1.12
	(0.07)	(0.05)	(0.16)	(0.24)	(0.07)	(0.07)	(0.12)	(0.16)
R^2	0.38	0.42	0.35	0.36	0.40	0.49	0.41	0.33
Second Stage								
Log EI Benefit	0.31	0.36	0.85	-0.30	0.36	0.36	0.79	0.36
	(0.25)	(0.36)	(0.54)	(0.43)	(0.26)	(0.31)	(0.73)	(0.64)
R^2	0.05	0.06	0.08	0.08	0.08	0.08	0.14	0.10
Number of observations	3947	2275	921	751	2787	1518	640	629
Definition 4: Whether unemployed is single earner couple and non-earner couple								
First Stage								
Log Average EI benefit	1.01	0.97	0.99	1.13	0.95	0.97	0.82	1.11
	(0.06)	(0.05)	(0.09)	(0.19)	(0.06)	(0.07)	(0.10)	(0.15)
R^2	0.42	0.45	0.48	0.41	0.35	0.40	0.34	0.33
Second Stage								
Log EI Benefit	-0.06	0.14	0.08	-0.19	0.61	0.88	0.93	-0.47
	(0.25)	(0.35)	(0.44)	(0.49)	(0.29)	(0.39)	(0.65)	(0.64)
R^2	0.07	0.08	0.13	0.13	0.06	0.06	0.10	0.06
Number of observations	2808	1515	672	621	3657	2409	807	801

[*] *significant at the* 10% level, [**] *significant at the* 5% level, [***] *significant at the* 1% level.

Note: Robust standard errors in parentheses. First stage and second stage coefficients are estimated from 2SLS model. The remaining controls include expected wage, standard deviation of the residual wage, age, province, education level, work tenure, full- or part-time status, whether one is part of a union, occupation, year effect and province effect. The occupation controls include five indicators for broad occupational categories. All variables measured in dollars are adjusted to the year 2000 level of inflation

Table 11: Hazard Ratio from the Cox Proportional Hazard Model

	(1)	(2)	(3)
Year	2004-2007	2008-2009	2010-2011
Panel A. Hazard Ratio			
	0.75***[a]	0.89*[b]	0.79***[c]
	(0.04)	(0.06)	(0.06)
Number of observations	4525	2621	2146
Panel B. Equality Coefficient Test			
p-value	a-b	0.045**	
	b-c	0.45	
	a-c	0.31	

* *significant at the* 10% level, ** *significant at the* 5% level, *** *significant at the* 1% level.
Note: p-value in parentheses. The sample consists of observations from 9292 workers from SLID. The controls include age, province, education level and log hourly wage.

Table 12: Hazard Model with Gamma Heterogeneity

	(1)	(2)	(3)
Year	2004-2007	2008-2009	2010-2011
Panel A. Hazard Ratio			
Hazard Ratio	0.71***	0.76*	0.74***
	(0.09)	(0.11)	(0.13)
Number of observations	4525	2621	2146
Panel B. Equality Coefficient Test			
p-value	a-b	0.07*	
	b-c	0.12	
	a-c	0.94	

* *significant at the* 10% level, ** *significant at the* 5% level, *** *significant at the* 1% level.
Note: p-value in parentheses. The sample consists of observations from 9292 workers from SLID. The controls include age, province, education level and log hourly wage.

Appendix B

Model Derivations

Proposition 1: The relationship between EI benefits and search intensity is positive negative with search time if search time and search expenditures are substitutes, $\frac{\partial s}{\partial m} < 0$ and $\frac{\partial h}{\partial m} < 0$ .The relationship between EI benefits and job search intensity is positive for the unemployed if search time and search expenditures are complements, $\frac{\partial s}{\partial m} > 0$ and $\frac{\partial h}{\partial m} > 0$ when $-c''(s) + \frac{\beta}{1-\beta} g_{ss}(s,h)Q < u''(24-h) + \frac{\beta}{1-\beta} g_{hh}(s,h)Q$.

Proof: The optimal job search intensity and reservation wage is given

The reservation wage is given by:

$$w_r = (1-\beta)V^U = m - c(s) + u(l) + \frac{\beta}{1-\beta} g(s,h)Q \tag{1.1}$$

where $Q = \int_{w_r}^{\infty} (w - w_r) dF(w)$, $\frac{\partial Q}{\partial m} = (F(w_r) - 1)\frac{\partial w_r}{\partial m}$.

The optimal search expenditures solves the first-order is condition

$$c'(s) = \frac{\beta}{1-\beta} \frac{\partial g(s_t, h_t)}{\partial s} Q \tag{1.2}$$

The optimal search time solves the first-order is condition

$$u'(24-h) = \frac{\beta}{1-\beta} g(s,h)Q \tag{1.3}$$

Taking the derivative of (A.1) with respect to m

$$\frac{\partial w_r}{\partial m} = 1 - c'(s_t)\frac{\partial s}{\partial m} + u'(l)\left(-\frac{\partial h}{\partial m}\right) + \frac{\beta}{1-\beta} g_s(s,h)\frac{\partial s}{\partial m} Q + \frac{\beta}{1-\beta} g_h(s,h)\frac{\partial h}{\partial m} Q + \frac{\beta}{1-\beta} g(s,h)\frac{\partial Q}{\partial m}$$

(1.4)

From (1.4), the model predicted that $\frac{\partial w_r}{\partial m} > 0$ and $\frac{\partial Q}{\partial m} < 0$.

Taking the derivative of (1.2) with respect to m

$$c''(s)\frac{\partial s}{\partial m} = \frac{\beta}{1-\beta} g_{ss}(s,h)\frac{\partial s}{\partial m} Q + \frac{\beta}{1-\beta} g_{sh}(s,h)\frac{\partial h}{\partial m} Q + \frac{\beta}{1-\beta} g_s(s,h)\frac{\partial Q}{\partial m} \tag{1.5}$$

Taking the derivative of (A.3) with respect to m

$$-u''(24-h)\frac{\partial h}{\partial m} = \frac{\beta}{1-\beta} g_{hh}(s,h)\frac{\partial h}{\partial m} Q + \frac{\beta}{1-\beta} g_{hs}(s,h)\frac{\partial s}{\partial m} Q + \frac{\beta}{1-\beta} g_s(s,h)\frac{\partial Q}{\partial m} \tag{1.6}$$

Assuming the probability of receiving a job offer is $g(s,h) = \left(s^{\rho} + h^{\rho}\right)^{\frac{1}{\rho}}$.

Then, $g_s(s,h) = \left(s^{\rho} + h^{\rho}\right)^{\frac{1}{\rho}} s^{\rho-1}$, $g_{ss}(s,h) = (\rho-1)\left(s^{\rho-2}h^{\rho}\right)\left(s^{\rho} + h^{\rho}\right)^{\rho-2}$,

$g_{sh}(s,h) = g_{hs}(s,h) = (1-\rho)\left(s^{\rho} + h^{\rho}\right)^{\frac{1}{\rho}-2}(hs)^{\rho-1}$, $g_{hh}(s,h) = (\rho-1)\left(h^{\rho-2}s^{\rho}\right)\left(s^{\rho} + h^{\rho}\right)^{\rho-2}$

As $\rho = 1$, search time and search expenditures are perfect substitutes, $g_{sh}(s,h) = g_{hs}(s,h) = g_{ss}(s,h) = g_{hh}(s,h) = 0$.

(1.5) can be written as

$$c''(s)\frac{\partial s}{\partial m} = \frac{\beta}{1-\beta} g_s(s,h)\frac{\partial Q}{\partial m} \tag{1.7}$$

(1.6) can be written as

$$-u''(24-h)\frac{\partial h}{\partial m} = \frac{\beta}{1-\beta} g_s(s,h)\frac{\partial Q}{\partial m} \tag{1.8}$$

(1.7) and (1.8) imply $\frac{\partial s}{\partial m} < 0$ and $\frac{\partial h}{\partial m} < 0$.

As $\rho \to -\infty$, search time and search expenditures are perfect complements.

From (1.5),

$$\left(-c''(s) + \frac{\beta}{1-\beta} g_{ss}(s,h)Q\right)\frac{\partial s}{\partial m} + \frac{\beta}{1-\beta} g_{sh}(s,h)\frac{\partial h}{\partial m} Q + \frac{\beta}{1-\beta} g_s(s,h)\frac{\partial Q}{\partial m} = 0$$

From (1.6),

$$\left(u''(24-h)+\frac{\beta}{1-\beta}g_{hh}(s,h)Q\right)\frac{\partial h}{\partial m}+\frac{\beta}{1-\beta}g_{hs}(s,h)\frac{\partial s}{\partial m}Q+\frac{\beta}{1-\beta}g_{s}(s,h)\frac{\partial Q}{\partial m}=0$$

As $\rho\to-\infty$, $g_{ss}(s,h)\to-\infty$, $g_{sh}(s,h)\to\infty$ and $g_{hs}(s,h)\to\infty$. Given $\frac{\partial w_r}{\partial m}>0$, the predictions are $\frac{\partial s}{\partial m}>0$ and $\frac{\partial h}{\partial m}>0$ if $-c''(s)+\frac{\beta}{1-\beta}g_{ss}(s,h)Q<u''(24-h)+\frac{\beta}{1-\beta}g_{hh}(s,h)Q$ (1.10). □

Proposition 2: Imposing credit constraint $m-c(s)\geq 0$, the relationship between EI benefits and search expenditures is negative and the relationship negative with search time if search time and search expenditures are substitutes, $\frac{\partial s}{\partial m}<0$ and $\frac{\partial h}{\partial m}<0$. The relationship between EI benefits and job search intensity is positive for the unemployed if search time and search expenditures are complements, $\frac{\partial s}{\partial m}>0$ and $\frac{\partial h}{\partial m}>0$ when $-(1+\lambda)c''(s)+\frac{\beta}{1-\beta}g_{ss}(s,h)Q<u''(24-h)+\frac{\beta}{1-\beta}g_{hh}(s,h)Q$ with credit constraint.

Proof: The optimal job search intensity and reservation wage is given

The reservation wage is given by:

$$w_r=(1-\beta)V^U=m-c(s)+u(l)+\frac{\beta}{1-\beta}g(s,h)Q \tag{2.1}$$

where $Q=\int_{w_r}^{\infty}(w-w_r)dF(w)$, $\frac{\partial Q}{\partial m}=(F(w_r)-1)\frac{\partial w_r}{\partial m}$.

The Lagrange equation is

$$L=m-c(s_t)+u(24-h)+\frac{\beta}{1-\beta}g(s,h)Q+\lambda(m-c(s)) \tag{2.2}$$

The optimal search expenditures solves the first-order is condition

$$(1+\lambda)c'(s)=\frac{\beta}{1-\beta}\frac{\partial g(s_t,h_t)}{\partial s}Q \tag{2.3}$$

The optimal search time solves the first-order is condition

$$u'(24-h)=\frac{\beta}{1-\beta}g(s,h)Q \tag{2.4}$$

Taking the derivative of (A.1) with respect to m

$$\frac{\partial w_r}{\partial m}=1-c'(s_t)\frac{\partial s}{\partial m}+u'(l)\left(-\frac{\partial h}{\partial m}\right)+\frac{\beta}{1-\beta}g_s(s,h)\frac{\partial s}{\partial m}Q+\frac{\beta}{1-\beta}g_h(s,h)\frac{\partial h}{\partial m}Q+\frac{\beta}{1-\beta}g(s,h)\frac{\partial Q}{\partial m}$$

(2.5)

Taking the derivative of (A.3) with respect to m

$$(1+\lambda)c''(s)\frac{\partial s}{\partial m}=\frac{\beta}{1-\beta}g_{ss}(s,h)\frac{\partial s}{\partial m}Q+\frac{\beta}{1-\beta}g_{sh}(s,h)\frac{\partial h}{\partial m}Q+\frac{\beta}{1-\beta}g_s(s,h)\frac{\partial Q}{\partial m} \tag{2.6}$$

Taking the derivative of (A.4) with respect to m

$$-u''(24-h)\frac{\partial h}{\partial m}=\frac{\beta}{1-\beta}g_{hh}(s,h)\frac{\partial h}{\partial m}Q+\frac{\beta}{1-\beta}g_{hs}(s,h)\frac{\partial s}{\partial m}Q+\frac{\beta}{1-\beta}g_s(s,h)\frac{\partial Q}{\partial m} \tag{2.7}$$

Assuming the probability of receiving a job offer is $g(s,h)=\left(s^{\rho}+h^{\rho}\right)^{\frac{1}{\rho}}$.

Then, $g_s(s,h)=\left(s^{\rho}+h^{\rho}\right)^{\frac{1}{\rho}}s^{\rho-1}$, $g_{ss}(s,h)=(\rho-1)\left(s^{\rho-2}h^{\rho}\right)\left(s^{\rho}+h^{\rho}\right)^{\rho-2}$,

$g_{sh}(s,h)=g_{hs}(s,h)=(1-\rho)\left(s^{\rho}+h^{\rho}\right)^{\frac{1}{\rho}-2}(hs)^{\rho-1}$, $g_{hh}(s,h)=(\rho-1)\left(h^{\rho-2}s^{\rho}\right)\left(s^{\rho}+h^{\rho}\right)^{\rho-2}$

As $\rho=1$, search time and search expenditures are perfect substitutes, $g_{sh}(s,h)=g_{hs}(s,h)=g_{ss}(s,h)=g_{hh}(s,h)=0$.

(2.6) can be written as

$$(1+\lambda)c''(s)\frac{\partial s}{\partial m}=\frac{\beta}{1-\beta}g_s(s,h)\frac{\partial Q}{\partial m} \tag{2.8}$$

(2.7) can be written as

$$-u''(24-h)\frac{\partial h}{\partial m}=\frac{\beta}{1-\beta}g_s(s,h)\frac{\partial Q}{\partial m} \tag{2.9}$$

From (2.5), $\frac{\partial w_r}{\partial m}>0$ implies $\frac{\partial Q}{\partial m}<0$, $\frac{\partial s}{\partial m}<0$ and $\frac{\partial h}{\partial m}<0$.

As $\rho\to-\infty$, search time and search expenditures are perfect complements.

From (2.6),

$$\left(-(1+\lambda)c''(s)+\frac{\beta}{1-\beta}g_{ss}(s,h)Q\right)\frac{\partial s}{\partial m}+\frac{\beta}{1-\beta}g_{sh}(s,h)\frac{\partial h}{\partial m}Q+\frac{\beta}{1-\beta}g_s(s,h)\frac{\partial Q}{\partial m}=0$$

From (2.7),

$$\left(u''(24-h)+\frac{\beta}{1-\beta}g_{hh}(s,h)Q\right)\frac{\partial h}{\partial m}+\frac{\beta}{1-\beta}g_{hs}(s,h)\frac{\partial s}{\partial m}Q+\frac{\beta}{1-\beta}g_s(s,h)\frac{\partial Q}{\partial m}=0$$

As $\rho\to-\infty$, $g_{ss}(s,h)\to-\infty$, $g_{sh}(s,h)\to\infty$ and $g_{hs}(s,h)\to\infty$ .Therefore $-(1+\lambda)c''(s)+\frac{\beta}{1-\beta}g_{ss}(s,h)Q<0$ and $\frac{\beta}{1-\beta}g_{hs}(s,h)\frac{\partial s}{\partial m}Q+\frac{\beta}{1-\beta}g_s(s,h)\frac{\partial Q}{\partial m}>0$.

Given $\frac{\partial w_r}{\partial m}>0$ at $\frac{\partial s}{\partial m}>0$, the possible prediction is $\frac{\partial s}{\partial m}>0$ and $\frac{\partial h}{\partial m}>0$ if $-(1+\lambda)c''(s)+\frac{\beta}{1-\beta}g_{ss}(s,h)Q<u''(24-h)+\frac{\beta}{1-\beta}g_{hh}(s,h)Q.$ Since $\lambda<0$, this condition is easier to be satisfied than equation (1.10). Therefore, under the above condition the sign of $\frac{\partial s}{\partial m}$ and $\frac{\partial h}{\partial m}$ are positive with credit constraint and the sign of $\frac{\partial s}{\partial m}$ and $\frac{\partial h}{\partial m}$ are negative without credit constraint. □

Proposition 3: Imposing credit constraint $m-c(s)\geq 0$, the relationship between EI benefits and the exit rate from unemployment to employment is negative if search time and search expenditures are perfect substitutes. The relationship between EI benefits and the exit rate from unemployment to employment is ambiguous if search time and search expenditures are perfect complements.

Proof: the definition of exit rate from unemployment given by

$$h(s,h,w_r) = \Pr(offer = 1 \mid s,h)\Pr(w \geq w_r)$$

Taking the derivative of (A.5) with respect to m

$$\frac{\partial E(s,h,w_r)}{\partial m} = \frac{\partial E(s,h,w_r)}{\partial s}\frac{\partial s}{\partial m} + \frac{\partial E(s,h,w_r)}{\partial h}\frac{\partial h}{\partial m} + \frac{\partial E(s,h,w_r)}{\partial w_r}\frac{\partial w_r}{\partial m}$$

Given $\frac{\partial E(s,h,w_r)}{\partial s} > 0$, $\frac{\partial E(s,h,w_r)}{\partial h} > 0$, $\frac{\partial E(s,h,w_r)}{\partial w_r} < 0$ and $\frac{\partial w_r}{\partial m} > 0$.

If search time and search expenditures are perfect substitutes, $\frac{\partial s}{\partial m} < 0$ and $\frac{\partial h}{\partial m} < 0$ then the sign of $\frac{\partial E(s,h,w_r)}{\partial m}$ is negative.

If search time and search expenditures are perfect complements, then the sign of $\frac{\partial E(s,h,w_r)}{\partial m}$ is ambiguous. □

Appendix C

Cox Proportional Hazard Model

The Cox proportional hazard model is a semi-parametric model introduced by Cox (1972) to analyze duration of unemployment spells. I define the failure event as an unemployed individual finding a job. This model allows us to estimate the relationship between EI benefits and unemployment durations controlling for individual characteristics. The hazard function is given by:

$$h_i(t, X_k) = h_0(t)\exp\left(\sum_{k=1}^{n} \beta_k X_{ik}\right)$$

By dividing both sides of the above equation by $h_0(t)$ and taking logarithms:

$$\log\frac{h_i(t, X_k)}{h_0(t)} = \sum_{k=1}^{n} \beta_k X_{ik}$$

At time t, $h(t)$ is the hazard rate, the exit rate from unemployment to employment. The baseline hazard function is given by $h_0(.)$ and describes the risk of becoming employed for individuals with $X_i = 0$, who serve as a reference cell or pivot. The time-invariant characteristics, such as gender, age and province, of individual i are X_i.

For the Cox proportional hazard model, the best interpretation of β for dummy variable is the hazard ratio (HR). $HR = \frac{h_i(t, X_k)}{h_j(t, X_k)} = \exp\left(\sum_{k=1}^{n} \beta_k \left(X_{ik} - X_{jk}\right)\right)$. The interpretation of Hazard Ratio is the one unit change in X_i on the hazard rate.

There are several features of the Cox proportional hazard model. First, this model considers the censoring data that allows us to have incomplete data on the exit date from unemployment. Second, the functional form for the baseline hazard can be very flexibly specified. Third, Cox proportional hazard model is better than the Kaplan-Meier (product-limit) estimator by releasing the assumption that everyone has the same characteristics. On the other hand, the Cox model contains two parts: the common part (baseline hazard function) and individual characteristics. Fourth, the model it is better than logit model, which only considers the initial and final status: either unemployment or employment.