



# The Job Seekers Model: Comparison of the General Search Model and the Unified Approach Model

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## Abstract

**Purpose:** Unemployment in its general form is a result stemming from the decisions of workers to search for a new and better paying job. In this study, the view that unemployed workers were not simply desiring any job, but one that would maximize their expected future outcome, was examined. **Research design, data, and methodology:** In order for collection of data and analysis, the panel dates of individual applications for job openings on job search websites were utilized to examine search effort and period for individuals. **Results:** It was found that the number of applications sent by a job seeker declined over their period of job searching, and that job seekers over a long duration of time tend to send relatively more applications per week throughout their entire search period. The latter finding contradicts the implications of the standard labor search effort models. **Conclusions:** It can be observed that these job search models fail to capture several key elements in search efforts, and that the search time for an offer is not entirely predetermined by the labor market conditions and socio-economic (individual) characteristics of the searcher. It can be shortened as he or she intensifies their job search efforts.

**Keywords:** Job Applications, Job Seeker Efforts, Search Period

**JEL Classification Code:** E24, J24, J31

## 1. Introduction

Following the pioneering work of researchers (e.g., Stigler, 1961; Hall, 1979) on the model of search and information, there have been subsequent variations that comprise the vast literature beginning in 1970. During the 1970's, a complementary explanation of unemployment along frictional lines emerged and, judging from the burgeoning professional literature on the topic, has received considerable acceptance. In its general form,

unemployment is viewed as a result from the decision of workers to search for a new and better paying job (Geary & Kennam, 1982; Ingsih & Prayitno, 2020).

Theories of job search have been formulated in order to better explain this aspect of economic behavior and propose possible policy recommendations that might be able to confer effects on this phenomenon (Kim, 2018; Kim & Eom, 2015). Although there are many variants of job search theory, most share several elements in common. Typically, these theories view unemployed workers as not simply desiring any job, but a job that would be able to maximize their expected future income. Because of this expectancy, the job searcher is assumed to be willing to pass up job offers that do not meet his or her criteria. According to the standard job search effort model (Lippman & McCall, 1970; Symon & Layard, 1984; Kim & Cho, 2020), a job seeker is assumed to know both the distribution function of wage offers and the cost of generating a job offer in the labor market. Under this assumption, the amount of search

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or the period of unemployment depends on the expected wage, i.e.; the minimum asking wage of the job seeker. This expected wage is optimal when the wage equates to the marginal cost of the future search with the expected marginal benefit of continued search. In this case, the costs of search are primarily the opportunity costs, or the earnings a worker would be receiving if any of the previous job offers were accepted. Furthermore, lower search costs increase the expected wage, and a higher expected wage decreases the probability of getting acceptable job offers. This, in turn, ends up lengthening the period of unemployment. Thus, the standard search model explains the period of unemployment as a result of a lower search cost (Sumner & Stephen, 1989; Yang & Cho, 2015).

However, this contrasts with a study by Stephenson (1976), which showed that more than ninety percent of the job seekers in his sample of unemployed youth accepted the first job they were offered. Also, the data from Job Search of unemployed, May 2006, indicated that over ninety percent of unemployed workers had received no job offers during that period of unemployment. If this is true in general, then unemployment seems to be much more of a waiting process than a sequential sampling of job offers, and thus its period is not the result of lower search effort costs (He & Feng, 2019).

The purpose of this study has been to show how variable search efforts can be modeled explicitly by using a unified framework approach. For example, considering that all other things are equal, if unemployment consists more of waiting for an offer than of sequential sampling of offers, then this waiting period might be shortened by intensifying systematic search efforts. Most determinants of the waiting time for an offer, e.g., labor market conditions and socio-economic characteristics of the searcher, are beyond his or her control, but the efforts of search are not, assuming other factors are constant. Since the majority of the job seekers have never received any job offers at all, the period of unemployment could be shortened by intensifying the search effort (Choi & Chu, 2019).

However, many reasons can be given for why the search efforts might also depend on the period of unemployment. If an unsuccessful job effort is discouraging, then there is a tendency for the searcher to visit several job offer places in the early weeks of an unemployment spell then reduce visits altogether. This, in turn, lowers the probability of getting an offer as the spell lengthens. Consequently, search effort, or the measure of the degree of search activity, could be inversely related to unemployment period. This important dependency of search effort on unemployment period has not been given adequate attention in job search literature.

Furthermore, if the job searcher was allowed to use the process of systematic search, i.e., the ranking by a search of

firms according to expected wage offers with the high firms visited first (Salop, 1973), then the expected wage could be decreased as the period of unemployment increases. Because the searcher visited the higher expected wage firms first, he or she decides to lower the expected wage as he or she fails to receive an acceptable offer. This implication of the declining expected wage trend is also significantly different from that of the general standard model which assumes sequential sampling for an acceptable offer, and the increase in the resulting wage with increased search time.

Given the empirical evidence contributed by Stephenson (1976), the central problem of job search may be in waiting for a single job offer. In contrast to the general standard model, it is assumed that the job searcher might intensify their effort to shorten his or her search time for an offer with a systematic type of search. Then the searcher would attempt to optimize their expected future earnings with respect to the search costs by simultaneously determining the expected wage and the level of search effort.

The first major objective of this empirical analysis of job search effort behavior is to test several hypotheses as suggested in a unified approach. If it is assumed that the job searcher waits for an offer, then this waiting period might be shortened by intensifying his or her systemic search efforts. This, in turn, may depend on the period of unemployment. The current study examines the relationship between search time, search effort and expected wage. A simultaneous equations framework is used in a unified approach where search effort is endogenous as well as the search time and the expected wage (Yoon & Kim, 2019; Astuti & Maryati, 2020).

The empirical results in this research generally support the hypotheses that unemployment consists more of waiting for an offer and the unemployed worker systematically searching for an offer. It is found that the expected wage tends to decline as search time increases, and a higher expected wage might not lengthen the search time for an offer. It might actually shorten the period of unemployment (Flaschel & Semler, 2007; Arfah & Putra, 2019). This is a significantly different result from the implication of the general standard search effort model. But it is not a surprising result when the central problem of searching and waiting for a job offer is considered.

## **2. Literature Review**

### **2.1. General Search Model**

The simplest job search model of an unemployed individual is a sequential decision with an infinite time horizon, no discounting, known invariant wage distribution,

and a risk neutral searcher. The simple job search model by McCall (1970) has been the foundation for both theoretical and empirical research in the economics of job search efforts. Hence, this model is examined in some detail in this study.

In the simplest sequential model of job search, an individual that is referred to as the searcher, is seeking employment. The search generates a job offer and with the job searcher’s knowledge of the distribution of wages for their particular skills and the cost of generating a job offer, the process of accepting or rejecting job offers occurs periodically (Kim & Kim, 2019). Under these conditions, the individual would wish to stop the job search effort process to maximize his expected gain. Hence, the job searcher rejects all offers below a single critical number, the expected minimum acceptable wage, and accepts offers only above this critical value (Kim, 2019).

By allowing the introduction of discounting in this simple model to include the effect of the time value of money, similar results can be found (Lippman & McCall, 1976) and the equation can be rewritten as:

$$C = G(W) - r \cdot W \tag{1}$$

where:

- r = discount rate
- G(W) = a strictly decreasing function of
- W = Expected wage

Since G(·) is a decreasing function of W, the equation implies that an increase in the discount rate r (interest rate) decreases the expected wage, in turn, shortening the period of unemployment. This can be set as an example of a higher discount rate inducing the job searcher to curtail search activities.

Until now, the expected wage was predetermined and assumed to remain the same over a period of search time, so that if an offer is rejected once, it will be rejected forever. The empirical studies by Kasper (1967) and Stephenson (1976) demonstrate, however, that unemployed job searchers do not behave in this manner. Kasper observed that the expected wage, W, declined approximately 3 percent per month of unemployment. One possible reason for decline of the expected wages lies with a finite time horizon without past search recall (i.e., the search process has no memory in that offers not accepted immediately are lost from the search process). This case has also been studied by Gronau (1971).

Let a finite time, L, be the number of periods of productive labor remaining in one’s life from the time of initial search until his non work income will be depleted. Then the optimal stopping rule satisfies the following equation:

$$= -C + (X) \tag{2}$$

where = the maximal benefit attainable when sampling without recall, It is clear that RL(X) is equal to the expected wage. By definition of the expected wage, this is a minimally acceptable offer. Thus, with L opportunities remaining, job searching will be stopped if the current offer is at least L, and continue if it is otherwise. According to this optimal stopping rule

becomes

$$= -C + (X) \tag{3}$$

A simple induction argument establishes that for each L, the expected wage when L periods (opportunities) are remaining, L is higher or equal to the future expected wage when less than L periods are remaining. Since the job search has to terminate after L opportunities. Consequently, the expected wage, W, is

$$W = W (E (L), \text{ other variables}) \tag{4}$$

where:

The economic interpretation of the first partial derivative is such that a longer period of unemployment encourages the job searcher to reduce the expected wage due to fewer remaining opportunities (Geary & Kennam, 1982).

Different models have different predictions with regard to the relations between search effort, search times and expected wages. Hence, it is important to summarize the assumptions and the implications of the general standard search effort models before continuing to the next section where the assumptions and the implications of the search models are significantly different from the general standard search effort model (Black, 2002; Bertrand & Mullainathan, 2004; Anderson, 2001).

The general standard search model (McCall, 1970; Lippman & McCall, 1976) assumes that:

- 1) The searcher receives a single job offer each period.
- 2) The job offers are sequential.
- 3) The searcher knows the cumulative wage distribution function for the labor market. This information does not change over time.
- 4) The searcher maximizes the present discounted value of expected lifetime income with finite time horizon.
- 5) The search effort remains the same over the search times.

Under these conditions, the general standard model has the following implications for the optimal search strategy (Lippman & McCall, 1976):

- 1) The higher (lower) the search cost, the lower (higher) is the expected wage, hence shortening (lengthening) the

duration of search time.

2) The searcher follows an expected wage strategy, and the expected wage declines over search time due to the finite time horizon.

### 3. Hypothesis Development

#### 3.1. A Unified Approach Model

The argument of the general standard search model, where lower search cost is regarded as a major deterrent to shortening unemployment period, is not realistic when the major portion of unemployed workers are looking for a job offer rather than continuing to search due to rejection of offers (Abbring, 2003). More than ninety percent of the job seekers, when describing the search behavior for their last job, said they took their first job offer in Stephenson's sample survey of unemployed male youths. Additionally, the data from Job Search effort of unemployed, May 2006, indicated that over ninety percent of the unemployed searchers had received no job offers during that spell of unemployment. This is contrary to the general standard search effort model, which usually assumes the job searchers have a choice among several offers (Han & Hausman, 2012).

Hence, the central problem of job search effort may be in waiting for a single job offer. This crucial factor, the search time for a job offer, has not been given adequate attention in the general standard search effort model. In order to incorporate this into the unified approach of the search effort model, let us assume for the job seeker that:

1) The searcher ranks firms by their expected wealth, and then samples the firms with the highest expected wealth from their chosen set (systematic sampling).

2) The searcher waits for an offer, and this waiting time can be shortened as he or she intensifies their search effort, increasing search cost.

3) The searcher is risk neutral.

4) The searcher knows the cumulative wage distribution function for the labor market.

5) The searcher maximizes the present discounted value of expected lifetime income. It should be noted that assumptions 1) and 2) are significantly different from that of the general standard search model and that these are more realistic assumptions.

Under these conditions, the optimal search effort is

$$E(\text{Max}(Y,)) - C(S) \cdot E(N) \quad (5)$$

where:

$E$  = Expected Value

$Y$  = The discounted expected future income stream from an offer.

= The present value of expected future minimum acceptable wage.

$C(S)$  = The unit time cost of search which is a strictly increasing function of search effort ( $S$ ).

$S$  = Search effort.

$N$  = The number of waiting periods to receive an offer.

The equation can be rewritten as:

$$C(S) = E[\text{Max}(Y,)] \quad (6)$$

At this point, it is important to compare this equation from the general standard effort model. Careful examination reveals that under the unified approach, the unit time cost of search can vary with the level of search effort while it is fixed in the general standard model. The economic interpretation of equation is such that the optimal search effort equation, the marginal cost and gain are attributable to more intensive search. Hence, the searcher sets the optimal level of search effort to equate the marginal cost and the marginal benefit of search.

The present value of expected future earnings depends on the expected wage. However, the expected wage decreases as the duration of unemployment increases due to systematic sampling; i.e., the searcher has a different subjective distribution for the wage rates offered by each firm as well as a subjective probability of being hired by any particular firm. Then the job searcher would first sample the highest expected wealth from their set group of firms.

Hence, the job seeker who may sample each firm once without the possibility of recalling the offers could solve the optimization issue by simultaneously determining the expected wage as well as the optimal level of search effort. Then, the period of unemployment would depend on the optimal level of search effort and expected wage; i.e.,  $E(N) = G(S, W, \text{other variables})$

where:  $S = S(C, N, \text{other variables})$  from optimization of equation and  $W = W(N, \text{other variables})$  from systematic sampling

### 4. Methodology

Since the implication of a unified approach effort model is significantly different from that of the general standard effort model, it is important to summarize the assumptions and implications of these two models below in Table 1.

**Table 1:** Comparison of the Unified Approach and the General Standard Model

	<b>A Unified Approach</b>	<b>General Standard Model</b>
Summary of different assumptions of each model	1. The job searches are systematic 2. The searcher waits for an offer 3. The search can be intensified to shorten the waiting time for an offer 4. Finite time horizon	1. The offers are sequential 2. The searcher receives a single job offer per period 3. The search effort remains the same over the duration of unemployment. 4. Finite time horizon
Objective	Maximize expected future income	Maximize expected future income
Optimization	The search effort and the expected wage have to be set to equate the marginal cost and the marginal benefit of search	An optimal reservation wage will equate the marginal cost and the marginal benefit of search
Implications	1. Higher (lower) variable cost will decrease (increase) search effort, and this in turn, lengthens (shortens) the period of unemployment 2. The expected wage declines over time due to systematic sampling	1. Lower search cost is a major deterrent to shortening the unemployment period 2. The expected wage declines over time due to the finite time horizon

### 5. Results

Estimates in this study are based on supplementary questions in the September 2018 monthly survey of the labor force conducted and tabulated for the Bureau of Labor Statistics by The Bureau of Census. Unemployed persons were asked to fill out a special supplemental questionnaire concerning their previous work experience and earnings, current job seeking activities and other similar questions in the September 2018 Current Population Survey. The data obtained from this questionnaire were obtained from subjects that were 16 years old and over who were unemployed as of September 15, 2018. A total of 102 individuals in the 2018 current population survey sample responded to a detailed questionnaire designed to shed light on the job search question. Approximately 30 percent of the subject sample did not comply.

If the unemployed person was at home when the interviewer was asking the basic labor force questions

pertaining to that household, the supplemental information was obtained on the spot.

**Table 2:** Variable Definitions

<b>Endogenous Variables</b>	<b>SE</b>	<b>Job seeking</b>
	<b>U</b>	<b>Unemployment period</b>
<b>Exogenous Variables</b>	S	Sex = 1 if female; 0 otherwise
	QT	Dummy = 1, if fired from or quit their last job; 0 otherwise

**Table 3:** Expected Signs of Coefficients – A Unified Approach

<b>A Unified Approach</b>		<b>Endogenous Variables</b>	
		<b>SE</b>	<b>U</b>
Endogenous Variables	SE		-
	U	-	
Exogenous Variables	S	-	

**Table 4:** Regression Estimates of a Unified Approach

<b>Variables</b>	<b>Seeker Efforts(SE)</b>	<b>UnemployedTime (U)</b>
SE		-0.092(-.762)
U	-0.261(-.582)	
S	(-2.725)	-5.75(-1.531)

**Table 5:** Regression Estimates of Job Search Effort Equation

<b>Variables</b>	<b>Males</b>	<b>Females</b>	<b>Total</b>
U	-0.467 (-.952)	(1.812)	-.261 (-.582)

It should be noted that several factors determine the amount of time an unemployed searcher spends looking for work. Job seekers who primarily use the telephone, letters, or answer newspaper ads may exhaust most job possibilities after devoting only a few hours a week. Some job searchers in relatively small cities and towns may exhaust all currently available local job sources by searching only a few hours a week. Only by expanding their search to the surrounding areas might they be able to fruit fully spend much more time in their job search. However, those who strongly feel the financial pinch of unemployment (wealth effect) may choose to spend a greater number of hours looking for work, regardless of local prospects.

Other measurements like willingness to go out of town

for job search should be included to measure true search effort. But with the difficulty of weighting variables with different units, the proposed solution was to utilize the answers to the above questionnaires. The average response for the sample subjects for job search periods was twenty-seven hours during a period of four weeks. The results shown highlight some interesting similarities and differences according to sex in the number of hours spent looking for work during the four weeks. The female's average job search hour was revealed to be significantly smaller than their male counterparts.

## 6. Conclusions

Detailed examinations of each equation (unemployment period, search effort, and expected wage) are elucidated in this study. Since the implication of a unified approach is significantly different from that of the general standard model, it is important for this research to summarize the assumptions and the implications of each model.

The purpose of this study has been to show how variable search intensity can be modeled explicitly using a unified approach framework. For instance, unemployment consists more of waiting for an offer than of sequential sampling offers, and that when other things are all considered equal, that this waiting period can be shortened by intensifying the systematic search efforts. However, the research intensify, in turn, may depend on the duration of unemployment. Also, the reservation wage decreases as the duration of unemployment increases due to the systematic search effort for an offer.

This study has also shown how such a model may be empirically estimated using a simultaneous equation framework in which search intensity is an endogenous variable as well as the search time and the expected wage. The search time for an offer is not entirely predetermined by the labor market conditions and socio-economic (individual) characteristics of the searcher. It can be shortened as he or she intensifies their search efforts. However, increased search effort is costly. Therefore, the cost of finding an offer, TC, is the product of the unit time cost of search, C, and the search time for an offer, N:

$$TC = C \cdot N \quad (7)$$

Furthermore, the unit time cost of search consists of two components. The first type of search cost is a fixed cost, which is the cost of time, or foregone earnings (opportunity cost). For the unemployment searcher who optimally sets an expected wage in a single time unit, the fixed cost of time is the income foregone at any job offer they reject below their expected wage for that time unit. However, the optimal expected wage is the upper limit to the fixed cost of search; i.e., C is a function of the expected wage.

It should also be noted that, assuming other things remain the same, as the searcher intensifies their search effort by spending more time and money on job search activities, they can shorten their duration of unemployment. That is, intensifying the search effort will increase the probability of getting an offer by expediting the arrival of an offer. Consequently, this will lower the period of unemployment. Therefore, it could be assumed that the mean search time for an offer is a decreasing function of job search effort.

In summary, the main results obtained here are a negative relationship between the length of job search and the expected wage providing support to the systematic search effort and a negative relationship between the length of job search and the search effort.

## 7. Limitations and Suggestions for Future Research

This study inevitably had several limitations. For example, the data sample size was restricted and the data analysis was configured with several restrictive assumptions. It is suggested that for future studies, differences in the expected wage distribution, job searcher's mobility, membership in unions and the marginal cost of job search effort is examined as well. In addition to this, further empirical analyses is needed utilizing time series data in order to comprehensively observe the correlations between job search and other aspects that play a role in its success.

## References

- Abbring, J.H. (2003). The Nonparametric Identification of Treatment Effects Models, *Econometrics*, 71(5), 1491-1517.
- Anderson, P. (2001). *Monitoring and Assisting Active Job Search in OECD Proceedings*, Labor Market Policies and the Public Employment Services.
- Arfah, A., & Putra, A. (2019). Analysis of Productivity and Distribution of Female Workers in FB's Industries, *Journal of Distribution Science*, 17(3), 31-39.
- Astuti, R., & Maryati, T. (2020). The Effect of Workplace Spirituality on Workplace Deviant Behavior and Employee Performance: The Role of Job Satisfaction, *The Journal of Asian Finance, Economics, and Business*, 7(12), 1017-1026.
- Bertrand, M., & Mullainathan, S. (2004). How Much Should We Trust Differences in Differences Estimates, *Quarterly Journal of Economics*, 119(1), 1313-1327.
- Black, R.M. (2002), Evaluating Welfare Reform in the United States, *Journal of Economics Literatures*, 40(4), 1105-1166.

- Choi, Y., & Chu, K. (2019). Social Network Services Addiction in the Workplace, *The Journal of Asian Finance Economics, and Business*, 6(1), 249-259.
- Flaschel, P.K., & Semler, W. (2007). Testing Wage and Price Phillips Curve for the United States, *Macroeconomics*, 58(4), 550-581.
- Ingsih, K., & Prayitno, A. (2020). Mediating Roles of Job Satisfaction toward the Organizational Commitment of Employees in the Public Sector, *The Journal of Asian Finance, Economics, and Business*, 7(10), 999-1006.
- Geary, P., & Kennan, J. (1982). The Employment Real Wage Relationship: An International Study, *Journal Political Economy*, 90(1), 854-872.
- Gronau, R. (1971). Information and Frictional Unemployment, *American Economic Review*, 61, 290-301.
- Hall, E. R. (1979). A Theory of the Natural Unemployment Rate and Duration of Unemployment. *Journal of Monetary Economics*, 17(3), 153-170.
- Han, A. & Hausman, (2012). Flexible Parametric Estimation of Duration and Competing Risk Models, *Journal of Human Resources*, 29(3), 695-717.
- He, Y., & Feng, W. (2019). A Study on the Determinants of Income Distribution: Evidence from Macroeconomics, *Journal of Distribution Science*, 17(1), 21-31.
- Kasper, H. (1967). The Asking Price of Labor and Duration of Unemployment, *The Review of Economics and Statistics*, 49, 165-172.
- Kim, J., & Eom, T. (2015). Efforts of Ethical Management on Job Satisfaction and Turnover in the South Korean Service Industry, *The Journal of Industrial Distribution & Business*, 6(1), 17-26.
- Kim, J., & Kim, J. (2019). A Study on the Influential Factors of Work Type and Job Satisfaction of Physically Challenged Laborers on Life Satisfaction, *The Journal of Industrial Distribution & Business*, 10(10), 15-21.
- Kim, Y. (2019). The Effects of Attractiveness of Service Employee's on Interpersonal Trust, Satisfaction, and Loyalty, *The Journal of Industrial Distribution & Business*, 10(10), 23-34.
- Kim, Y., & Cho, Y. (2020). Investigating Determinants that Affect Job and Life Dissatisfaction: The Case of Relocation, *The Journal of Industrial Distribution & Business*, 11(3), 29-38.
- Kim, Y. M. (2018). A Study on the Effect of Job Distribution on Quality of Life for Good Job Behavior, *Journal of Distribution Science*, 16(9), 25-33.
- Lippman, S.A., & McCall, J. J. (1976). The Economics of Job Search, *Quarterly Journal of Economics*, 84, 155-189.
- McCall, J.J. (1970). The Economics of Job Search, *Quarterly Journal of Economics*, 84(1), 113-126.
- Salop, S. C. (1973). Systematic Job Search and Unemployment, *The Review of Economics and Statistics*, 40, 191-202.
- Stephenson, S. P., Jr. (1976). The Economics of Youth Job Search Behavior, *The Review of Economics and Statistics*, 58, 104-111.
- Stigler, G. J. (1961). The Economics of Information, *Journal of Political Economy*, 69, 213-225.
- Symons, J., & Layard, R. (1984). Neo-classical Demand for Labor Functions for Six Major Economies, *Economic Journal*, 94 (376), 788-99.
- Sumner, S., & Stephen, S. (1989). Real Wages, Employment, and the Phillips Curve. *Journal of Political Economy*, 97(265), 706-720.
- Yang, H., & Cho, H. (2015). Effects of Individuals, Leader Relationship, and Groups on Innovative Work Behaviors, *Journal of Industrial Distribution & Business*, 6(3), 19-25.
- Yoon, K., & Kim, B. (2019). The Effects of Job Crafting on Career Success of Multinational Corporation's Employees, *Journal of Asian Finance, Economics and Business*, 6(4), 213-225.