Université de Montréal
Faculté des arts et des sciences
Département de sciences économiques

CAHIER 9410

HIDDEN UNEMPLOYMENT : A SEARCH THEORETIC INTERPRETATION

Robert Kollmann[1]

[1] Département de sciences économiques and Centre de recherche et développement en économique (C.R.D.E.), Université de Montréal

May 1994

This is a revised version of a note written while I was a graduate student in the Economics Department at the University of Chicago. Financial support from the Earhart Foundation and from the Fonds FCAR (Québec) is gratefully acknowledged.

C.P. 6128, succursale A
Montréal (Québec)
H3C 3J7

Télécopieur (FAX): (514) 343-5831
Courrier électronique (E-Mail): econo@tornade.ERE.Umontreal.CA

Ce cahier a également été publié au Centre de recherche et développement en économique (C.R.D.E.) (publication no 1294).

Dépôt légal - 1994
Bibliothèque nationale du Québec
Bibliothèque nationale du Canada

ISSN 0709-9231

RÉSUMÉ

Des enquêtes sur la force de travail montrent qu'aux Etats-Unis de nombreux sans-emp qui ne cherchent pas d'emploi et qui ne sont donc pas considérés comme des chômeurs p la statistique officielle déclarent qu'ils "désirent un emploi maintenant". Un modèle de *j search* est utilisé afin d'interpréter ce phénomène.

Mots clés : chômage caché, *job search.*

ABSTRACT

Labor force surveys show that in the United States a significant fraction of the jobless who do not search for work, and who are therefore not classified as unemployed by official statistics, state that they "want a job now". A model of job search is used to interpret this phenomenon.

Key words : hidden unemployment, job search.

1. Introduction

Official labor force statistics define an unemployed worker as one who does not have a job and who searches for a job. The labor force consists of all persons who are employed or unemployed. Labor force surveys show that a sizable number of jobless who are not classified as unemployed by official statistics because they are not actively looking for work (and who are thus not counted as part of the labor force--"non-participants", henceforth), do declare that they want a job. For example, the US Current Population Survey shows that on average during the period 1971-92 the number of non-participants who stated that they "want a job now" amounted to 77% of the number of workers classified as unemployed according to the official definition.[1]

Several studies have analyzed these "hidden" unemployed who are excluded from official unemployment figures,[2] but this earlier work has been mainly descriptive and has lacked a clear theoretical framework.

As jobless workers who do not search for work are rather unlikely to obtain job offers, the fact that a large number of jobless who are not searching for jobs state that they "want a job now" is conceptually quite

---

[1] Based on quarterly figures from Employment and Earnings (Bureau of Labor Statistics). See OECD (1987, 1993) for evidence concerning other industrialized countries.

[2] See, e.g., Stein (1967), Flaim (1969), Rosen (1973) Gellner (1975), Challier (1987), OECD (1987). For discussions on whether these workers should be included in official unemployment statistics, see, e.g., NCEUS (1979, ch.2 and ch.4). Much attention has been devoted to "discouraged" workers, i.e. to jobless wanting a job who are not actively searching for work because they view search as futile (see, e.g., Flaim (1973, 1984), Gastwirth (1973), Mincer (1973), Rosenblum (1974), Finegan (1978, 1979, 1981), Ondeck (1978), Job (1979), OECD (1993)). The present analysis does not distinguish between "discouraged" workers and other non-participants who want a job (recent work suggests that these two sets of workers are behaviorally rather similar, in particular when compared to the unemployed and to those jobless who do not want jobs, see OECD (1987)).

puzzling. The aim of the present paper is to provide a theoretical analysis of this intriguing phenomenon.

The key idea of the paper is that a person declares that he/she wants a job if the value of that person's non-market time is smaller than the expected wage which that person would obtain by conducting optimal job search. Based on this interpretation, we predict that, ceteris paribus, the number of non-participants who want jobs is larger when the cost of job search is high, when few jobs are available (i.e. when the arrival rate of job offers is low) and when the mean wage offer is large. Furthermore, this interpretation implies that non-participants who want a job are more likely to enter the labor force at some future time than those who do not want a job, as is consistent with the data (see, e.g., Job (1979), OECD (1987)).

2. An illustrative model

For illustrative purposes, a standard search model with infinitely lived workers is considered (see, e.g., Devine and Kiefer (1991, ch.2), Flinn and Heckman (1982)). The model assumes continuous time. Job offers arrive by a Poisson process with parameter a. Wage offers are independent draws from a time-invariant wage distribution $F(w-\mu)$, where w is the wage (an increase in the parameter μ translates the distribution of wage offers to the right). Offers which are rejected cannot be recalled later. F(.) is strictly increasing and differentiable. Once a worker is hired, he stays with his employer forever. Workers have a constant rate of time preference $i>0$. Their instantaneous utility while working equals their salary w. Jobless workers who do not search for work have instantaneous utility ω, while those who search have instantaneous utility k (ω represents the value of the worker's non-market time; k equals ω minus the cost of job search).

Under these assumptions, a rational jobless person searches for work if $\omega<\rho^*$ holds, where ρ^* is defined by:

$$\rho^* = k + (a/i) \int_{\rho^*}^{\infty} (w-\rho)\, F'(w-\mu)\, dw.^3 \qquad (1)$$

Hence:

$$\omega < \rho^* \quad \Rightarrow \quad \text{worker searches for work.} \qquad (2)$$

ρ^* is also the optimal reservation wage adopted by a worker who does search, i.e. such a worker should reject all wage offers smaller than ρ^* (see Devine and Kiefer (1991)).

When does a worker want a job?

Job search is an unavoidable precondition for finding work. If a worker states that he wants a job, I interpret this as meaning that the expected wage which he would obtain by conducting optimal job search (i.e. using the reservation wage ρ^*) exceeds his instantaneous utility while not searching (ω):

$$\omega < E[w|w>\rho^*] \quad \Rightarrow \quad \text{worker wants a job.} \qquad (3)$$

Note that $\rho^* < E[w|w>\rho^*]$. Hence:

$$\rho^* < \omega < E[w|w>\rho^*] \quad \Rightarrow \quad \text{worker is non-participant, but wants job.} \qquad (4)$$

The following figure illustrates this interpretation.

---

[3] It can be shown that ρ^*/i is the expected lifetime utility of a jobless individual conducting optimal job search.

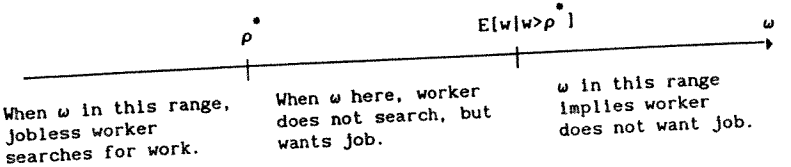

Figure 1.

3. Implications of the proposed interpretation

Figure 1 suggests that non-participants who want a job are more likely to join the labor force at some future date than other non-participants (note, for example, that a small reduction in the value of non-market time ω is more likely to induce a non-participant who wants a job to start searching for work than one who does not want a job). This is consistent with empirical evidence according to which non-participants who state that they desire work are more likely to be classified as unemployed and to find employment at future dates than non-participants who do not want a job (see OECD (1987), Job (1979)).

We see from (1) that when k equals ω (i.e. when job search is costless), then $\rho^* > \omega$. Hence the phenomenon that non-participants declare that they want a job only arises when searching for work is costly (i.e. when k is smaller than ω).

Additional predictions can be obtained if one assumes that the logged density of wage offers is strictly concave.[4] As shown in the appendix, this assumption guarantees that

[4] The normal density, for example, meets this criterion.

$d(E[w|w>\rho^*]-\rho^*)/da<0$, $d(E[w|w>\rho^*]-\rho^*)/dk<0$ and $d(E[w|w>\rho^*]-\rho^*)/d\mu>0$. (5)

Hence we see that, under this distributional assumption, a reduction in the arrival rate of job offers, an increase in the cost of job search or a translation of the distribution of wage offers to the right (i.e. an increase in μ) widens the interval $(\rho^*, E[w|w>\rho^*])$; hence these parameter changes can be expected to increase the proportion of jobless who are not searching for work but who want jobs.[5] Empirically, wages tend to be somewhat procylical (Mankiw (1991, p.294)); the arrival rate of job offers is likely to be procyclical and search costs are probably countercyclical (job openings are scarce during recessions). Based on the last expression in (5), we thus expect that the proportion of jobless wanting a job is procyclical, whereas the first two expressions would imply that it is countercyclical.[6] The latter implication is consistent with data from the US Current Population Survey.[7]

---

[5] At least under the assumption that the value on non-market time, ω, is (approximately) uniformly distributed among the jobless.

[6] But note that this argument is merely suggestive, because the model used in section 2 is not designed for the analysis of business cycles, as it assumes that the parameters of the decision problem faced by a worker who searches for work do not change over time.

[7] The correlation between quarterly real GDP (detrended using the Hodrick and Prescott (1980) filter) and the ratio of the number of non-participants who want a job to the total number of jobless is -.41; for the ratio of the number of non-participants who want a job to the total number of non-participants, the correlation with detrended real GDP is -.29.

Bibliography

Burdett, K. and J. Ondrich (1985). How Changes in Labor Demand Affect Unemployed Workers. Journal of Labor Economics, 3: 1-10.

Challier, M. (1987). Inactivité et Chômage Caché. Economies et Sociétés, 21: 83-100.

Devine, T. and N. Kiefer (1991). Empirical Labor Economics, The Search Approach. Oxford University Press, New York.

Finegan, T. A. (1978). Improving Our Information on Discouraged Workers. Monthly Labor Review, September: 15-25.

Finegan, T. A. (1979). The Measurement, Behavior, and Classification of Discouraged Workers. In: National Commission on Employment and Unemployment Statistics, Appendix, Volume 1: 193-235.

Finegan. T. A. (1981). Discouraged Workers and Economic Fluctuations. Industrial and Labor Relations Review, 35: 88-102.

Flaim, P. (1969). Persons Not in the Labor Force: Who They Are and Why They Don't Work. Monthly Labor Review, July: 3-14.

Flaim, P. (1973). Discouraged Workers and Changes in Unemployment. Monthly Labor Review, March: 8-16.

Flaim, P. (1984). Discouraged Workers: How Strong Are Their Links to the Job Market?, Monthly Labor Review, August: 8-11.

Flinn. C. and J. Heckman (1983). Are Unemployment and Out of the Labor Force Behaviorally Distinct Labor Force States? Journal of Labor Economics, 1: 28-42.

Gastwirth, J. (1973). Estimating the Number of 'Hidden Unemployed'. Monthly Labor Review, March: 17-26.

Gellner, C. (1975). Enlarging the Concept of a Labor Reserve. Monthly Labor Review, April: 20-28.

Hodrick, R. and E. Prescott (1980). Postwar U.S. Business Cycles: An Empirical Investigation. Manuscript, Carnegie-Mellon University.

Job, B. C. (1979). How Likely Are Individuals To Enter The Labor Force?, Monthly Labor Review, September: 28-34.

Mankiw, N.G. (1991). Macroeconomics. Worth Publishers, New York.

Mincer, J. (1973). Determining Who Are the 'Hidden Unemployed'. Monthly Labor Review, March: 27-30.

NCEUS, National Commission on Employment and Unemployment Statistics (1979). Counting the Labor Force. US Government Printing Office, Washington, D.C. .

OECD, Organisation for Economic Cooperation and Development (1987). Employment Outlook.

OECD, Organisation for Economic Cooperation and Development (1993). Employment Outlook.

Ondeck, C. (1978). Discouraged Workers' Link to Jobless Rate Reaffirmed. Monthly Labor Review, October: 40-42.

Rosen, C. (1973). Hidden Unemployment and Related Issues, Monthly Labor Review, March: 31-37.

Rosenblum, M. (1974). Discouraged Workers and Unemployment. Monthly Labor Review, September: 28-30.

Stein, R. (1967). Reasons for Nonparticipation in the Labor Force. Monthly Labor Review, July: 22-27.

Appendix: Proof of (5).

Totally differentiating (1), we obtain:

$$d\rho^*/da=\left[(1-F(\rho^*-\mu))(E[w|w>\rho^*]-\rho^*)\right]/\left[1+a(1-F(\rho^*-\mu))\right] > 0,$$

$$d\rho^*/dk=1/\left[1+a(1-F(\rho^*-\mu))\right] > 0 \quad \text{and}$$

$$d\rho^*/d\mu=a(1-F(\rho^*-\mu))/\left[1+a(1-F(\rho^*-\mu))\right] > 0.$$

Note that $\partial E[w|w>z]/\partial z>0$ for all z. Strict logconcavity of the density of w (i.e. strict concavity of $\ln(F'(w-\mu))$) implies $\partial E[w|w>z]/\partial z<1$ for all z (see proposition 1 in Burdett and Ondrich (1985)). Assuming strict logconcavity, we therefore have:[8]

$$d\{E[w|w>\rho^*] - \rho^*\}/da=[\partial E[w|w>\rho^*]/\partial\rho^* - 1][d\rho^*/da] < 0,$$

$$d\{E[w|w>\rho^*] - \rho^*\}/dk=[\partial E[w|w>\rho^*]/\partial\rho^* - 1][d\rho^*/dk] < 0,$$

$$d\{E[w|w>\rho^*] - \rho^*\}/d\mu=[\partial E[w|w>\rho^*]/\partial\rho^* - 1][d\rho^*/d\mu - 1] > 0.$$

---

[8] Note that $\partial E[w|w>z]/\partial z+\partial E[w|w>z]/\partial\mu=1$ for all z (see Burdett and Ondrich (1985)).

Université de Montréal
Département de sciences économiques
Centre de documentation
C.P. 6128, succursale A
Montréal (Québec)
H3C 3J7

Cahiers de recherche (Discussion papers)
1993 à aujourd'hui (1993 to date)

Si vous désirez obtenir un exemplaire, vous n'avez qu'à faire parvenir votre demande et votre paiement (5 $ l'unité) à l'adresse ci-haut mentionnée. / To obtain a copy ($ 5 each), please send your request and prepayment to the above-mentioned address.

9301 : Mercenier, Jean, "Nonuniqueness of Solutions in Applied General-Equilibrium Models with Scale Economies and Imperfect Competition : A Theoretical *Curiosum*?", 26 pages.

9302 : Lemieux, Thomas, "Unions and Wage Inequality in Canada and in the United States", 66 pages.

9303 : Lemieux, Thomas, "Estimating the Effects of Unions on Wage Inequality in a Two-Sector Model with Comparative Advantage and Non-Random Selection", 54 pages.

9304 : Harchaoui, Tarek H., "Time-Varying Risks and Returns : Evidence from Mining Industries Data", 20 pages.

9305 : Lévy-Garboua, Louis et Claude Montmarquette, "Une étude économétrique de la demande de théâtre sur données individuelles", 40 pages.

9306 : Montmarquette, Claude, Rachel Houle et Sophie Mahseredjian, "The Determinants of University Dropouts : A Longitudinal Analysis", 17 pages.

9307 : Gaudry, Marc, Benedikt Mandel et Werner Rothengatter, "A Disaggregate Box-Cox Logit Mode Choice Model of Intercity Passenger Travel in Germany", 17 pages.

9308 : Fortin, Nicole M., "Borrowing Constraints and Female Labor Supply : Nonparametric and Parametric Evidence of the Impact of Mortgage Lending Rules", 38 pages.

9309 : Dionne, Georges, Robert Gagné, François Gagnon et Charles Vanasse, "Debt, Moral Hazard and Airline Safety : an Empirical Evidence", 34 pages.

9310 : Dionne, Georges, Anne Gibbens et Pierre St-Michel, "An Economic Analysis of Insurance Fraud", 40 pages.

311 : Gaudry, Marc, "Asymmetric Shape and Variable Tail Thickness in Multinomial Probabilistic Responses to Significant Transport Service Level Changes", 26 pages.

312 : Laferrière, Richard et Marc Gaudry, "Testing the Linear Inverse Power Transformation Logit Mode Choice Model", 29 pages.

313 : Kollmann, Robert, "Fiscal Policy, Technology Shocks and the US Trade Balance Deficit", 38 pages.

314 : Ghysels, Eric, "A Time Series Model With Periodic Stochastic Regime Switching", 54 pages.

315 : Allard, Marie, Camille Bronsard et Lise Salvas-Bronsard, "C*-Conjugate Expectations and Duality", 22 pages.

316 : Dudley, Leonard et Claude Montmarquette, "Government Size and Economic Convergence", 28 pages.

317 : Bronsard, Camille, "L'histoire de l'économie mathématique racontée à Juliette", 17 pages.

318 : Tremblay, Rodrigue, "The Quest for Competitiveness and Export-Led Growth", 16 pages.

319 : Proulx, Pierre-Paul, "L'ALÉNA", 12 pages.

320 : Proulx, Pierre-Paul, "Le Québec dans l'ALÉNA", 28 pages.

321 : Dionne, Georges, Denise Desjardins, Claire Laberge-Nadeau et Urs Magg, "Medical Conditions, Risk Exposure and Truck Drivers' Accidents : an Analysis with Count Data Regression Models, 20 pages.

322 : Ghysels, Eric, "Seasonal Adjustment and Other Data Transformations", 28 pages.

323 : Dufour, Jean-Marie et David Tessier, "On the Relationship Between Impulse Response Analysis, Innovation Accounting and Granger Causality", 12 pages.

324 : Dufour, Jean-Marie et Eric Renault, "Causalités à court et à long terme dans les modèles VAR et ARIMA multivariés", 68 pages.

325 : Ghysels, Eric et Alastair Hall, "On Periodic Time Series and Testing the Unit Root Hypothesis", 36 pages.

326 : Campbell, Bryan et Jean-Marie Dufour, "Exact Nonparametric Orthogonality and Random Walk Tests", 28 pages.

327 : Proulx, Pierre-Paul, "Quebec in North America : from a Borderlands to a Borderless Economy : an Examination of its Trade Flows with the U.S.A. at the National and Regional Levels", 24 pages.

328 : Proulx, Pierre-Paul, "L'ALÉNA, le Québec et la mutation de son espace économique", 36 pages.

9329 : Sprumont, Yves, "Strategyproof Collective Choice in Economic and Politic Environments", 48 pages.

9330 : Cardia, Emanuela et Steve Ambler, "The Cyclical Behaviour of Wages ar Profits Under Imperfect Competition", 24 pages.

9331 : Arcand, Jean-Louis L. et Elise S. Brezis, "Disequilibrium Dynamics During th Great Depression", 64 pages.

9332 : Beaudry, Paul et Michel Poitevin, "Contract Renegotiation : a Simple Framewor and Implications for Organization Theory", 48 pages.

9333 : Ghysels, Eric et Alastair Hall, "On Periodic Time Series and Testing the Uni Root Hypothesis", 36 pages. (Ce cahier portait déjà le no 9325.)

9333 : Dagenais, Marcel G. et Jean-Marie Dufour, "Pitfalls of Rescaling Regressior Models with Box-Cox Transformations", 16 pages.

9334 : Bonomo, Marco et René Garcia, "Disappointment Aversion as a Solution to the Equity Premium and the Risk-Free Rate Puzzles", 40 pages.

9335 : Ghysels, Eric et Offer Lieberman, "Dynamic Regression and Filtered Data Series : A Laplace Approximation to the Effects of Filtering in Small Samples", 24 pages.

9336 : Kollmann, Robert, "The Duration of Unemployment as A Signal : Implications for Labor Market Equilibrium", 19 pages.

9337 : Kollmann, Robert, "Fertility, Consumption and Bequests in a Model with Non-Dynastic Parental Altruism", 22 pages.

9401 : Mercenier, Jean et Bernardin Akitoby, "On Intertemporal General-Equilibrium Reallocation Effects of Europe's move to a Single Market", janvier 1994, 41 pages.

9402 : Gauthier, Céline et Michel Poitevin, "Using Ex Ante Payments in Sefl-Enforcing Risk-Sharing Contracts, février 1994, 38 pages.

9403 : Ghysels, Eric et Joanna Jasiak, "Stochastic Volatility and Time Deformation : an Application of Trading Volume and Leverage Effects, février 1994, 37 pages.

9404 : Dagenais, Marcel G. et Denyse L. Dagenais, "GMM Estimators for Linear Regression Models with Errors in the Variables", avril 1994, 33 pages.

9405 : Bronsard, C., F. Rosenwald et L. Salvas-Bronsard, "Evidence on Corporate Private Debt Finance and the Term Structure of Interest Rates", avril 1994, 42 pages.

9406 : Dinardo, John, Nicole M. Fortin et Thomas Lemieux, "Labor Market Institutions and the Distribution of Wages, 1973-1992 : A Semiparametric Approach", avril 1994, 73 pages.

9407 : Campbell, Bryan et Jean-Marie Dufour, "Exact Nonparametric Tests of Orthogonality and Random Walk in the Presence of a Drift Parameter", avril 1994, 32 pages.

9408 : Bollerslev, Tim et Eric Ghysels, "Periodic Autoregressive Conditional Heteroskedasticity", mai 1994, 29 pages.

9409 : Cardia, Emanuela, "The Effects of Government Financial Policies : Can We Assume Ricardian Equivalence?", mai 1994, 42 pages.

9410 : Kollmann, Robert, "Hidden Unemployment : A Search Theoretic Interpretation", mai 1994, 9 pages.