How Much of Canada's Unemployment Is Structural?

Lars Osberg
Department of Economics
Dalhousie University

Zhengxi Lin
Micro Economic Analysis Division/
Business and Labour Market Analysis Division
Statistics Canada

Cet article débute par la définition: "le chômage structurel se produit lorsque les travailleurs sont incapables d'occuper un emploi pour des raisons telles qu'ils n'ont pas les compétences, ne vivent pas là où les emplois sont disponibles ou ne veulent pas travailler au salaire offert par le marché". Cela a pour conséquences que les nombreux postes vacants dans le marché du travail canadien constituent une borne supérieure lorsque l'on parle de "chômage structurel". Cet article donne un résumé des estimés disponibles sur le taux de postes vacants au Canada. Dans le secteur des hautes technologies, ce taux peut être équivalent à 2.2 pour cent de la force de travail mais l'évidence provenant de sondages plus représentatifs révèle que ce taux se situe entre 0.45 et 0.75 pour cent pour l'économie dans sa totalité. Malgré une tendance à la hausse dans la relation entre l'indice d'offre d'emploi et le taux de chômage, tendance qui a suscitée des inquiétudes durant les années 80, on note un renversement de la tendance dans les années 90.

This paper starts from the definition that "structural unemployment occurs when workers are unable to fill available jobs because they lack the skills, do not live where jobs are available, or are unwilling to work at the wage rate offered in the market." This implies that the number of vacancies in the Canadian labour market is an upper bound to the extent of "structural unemployment." The paper summarizes available estimates of the vacancy rate in Canada. In the high technology sector, vacancies may be equivalent to 2.2 percent of the labour force but evidence from more representative surveys indicates a range of 0.45 to 0.75 percent for the economy as a whole. Although during the 1980s the outward shift in the relationship between the Help-Wanted Index and the unemployment rate raised concerns that structural unemployment was an increasing problem in Canada, that shift has been reversed in the 1990s.

INTRODUCTION

The objective of this paper is to estimate the fraction of Canada's current unemployment that is "structural" in nature. But, why does the issue matter? One reason is microeconomic in orientation. If much of Canada's current unemployment is due to a mismatch between the characteristics of Canada's unemployed and of available job vacancies, then more effort in retraining, mobility, and other labour market adjustment policies to increase the "flexibility" of the Canadian labour market may be

appropriate. A second reason, from a macroeconomic perspective, is that when price stability has become the only objective of monetary policy, monetary authorities will see it as crucial to avoid any chance that aggregate demand might exceed aggregate potential output. Assessing the relative importance of structural unemployment, compared to the fraction of current unemployment that is due to aggregate demand deficiency, is crucial to estimates of potential output.[1]

What exactly is "structural unemployment"? Debates on economic policy can easily degenerate into confusion if the same term is used with different meanings, and structural unemployment has found a variety of definitions in macroeconomics and labour economics over the years. This paper adopts the definition advocated by Finance Canada: "Structural unemployment occurs when workers are unable to fill available jobs because they lack the skills, do not live where jobs are available, or are unwilling to work at the wage rate offered in the market."[2]

Although some definitions of "structural unemployment" have interpreted it more loosely to mean "long term and chronic unemployment,"[3] such a definition leaves its origins unexplained. Furthermore, if structural unemployment is defined to be "long-term and chronic" unemployment, it is clearly circular to argue that structural unemployment is the cause of long-term and chronic unemployment. The Finance Canada definition therefore has two major advantages: (i) a close fit with the normal usage of the term "structural unemployment" in the labour economics literature; and (ii) the possibility of empirical examination, independent of the aggregate unemployment which structural unemployment seeks to explain. If structural unemployment occurs when workers are unable to fill available jobs, the number of available jobs sets an upper bound to the extent of structural unemployment.[4] Empirical measurement of job vacancies is therefore crucial. Hence, the empirical strategy of this paper is to present estimates of the number of vacancies in the Canadian labour market using data from the Workplace and Employee Survey (WES), the Help-Wanted Index (HWI) and historical vacancy data from the Job Vacancy Survey (JVS).

The next section begins by considering what can be learned from some of the ad hoc surveys which generate headlines in the press on skill shortages. The following section then discusses the snapshot of vacancies obtained with direct questioning of employers in the WES. We then examine the relationship between the Help-Wanted Index and the unemployment rate in the 1980s and 1990s; and look at how the HWI has been used by other authors to estimate a trend in aggregate vacancies over time. The paper then asks what can be learned from the relationship between direct observation of vacancies in the Job Vacancy Survey and movements in the Help-Wanted Index since that survey was discontinued. Our conclusions make up the final section.

Although some authors (e.g., Burdett and Cunningham 1994, p. 148) use the term "vacancy" to include future openings, in this paper we need a concept that is comparable with the current stock of unemployed workers — hence we restrict the term "vacancy" to mean an unoccupied position that is potentially *immediately* available to an *external* candidate. Because most jobs are filled by an interview process with a future start date, most labour market matching activity proceeds without ever generating either unemployment or a vacancy thus defined[5] (e.g., a graduate student who goes directly from being a teaching assistant to being a professor). However, if the hypothesis of structural unemployment is to be used to explain some fraction of the stock of people currently unemployed (i.e., immediately available for jobs), a comparable measure of the current stock of available jobs is required.

MISCELLANEOUS SURVEYS AND HEADLINES

Although economics is supposed to be a quantitative and rigorous discipline, economists are, in practice, exposed to (and influenced by) a great deal

of qualitative, non-rigorous information. Impressions of whether there are "many" or "only a few" available jobs are inevitably affected by newspaper headlines about skills shortages in high-tech industries — despite the relatively small size of this sector.[6] Perceptions of the extent of structural unemployment are also inevitably influenced by individual case studies, such as the powerful imagery of Newfoundland outports devastated by the closure of the cod fishery, despite the very small size of such villages, both absolutely and as a percentage of the Canadian population. Since powerful images and compelling anecdotes may have much more emotional impact than statistical tables, the debate on structural unemployment can sometimes become essentially non-quantitative in nature.

However, newspaper headlines do sometimes appeal to statistics. Following these up can be a frustrating experience. In addition to an endemic vagueness about the relevant sampling frame under consideration, journalistic discussion of labour shortages often shifts casually between vaguely specified measures — sometimes referring to the future hiring intentions of firms (over varying time horizons), "difficulties" encountered by firms in hiring, "concern" over labour availability, reasons for production delays, etc. The normal finding is a pervasive dissatisfaction. As Roy, Henson and Lavoie (1996) note, in a market system general and persistent shortages will be resolved by the market if employers are willing to pay more, or train more. All the same, "from an (individual) employer's standpoint, skills of employees are always in shortage and it is very easy to elicit positive responses to questions about skill shortages" (1996, p. 25).

For example, Hamilton's headline ("Tech Skills Shortage Hurts Firms" and first sentence — "Canada's continuing shortage of skilled high tech workers has caused project delays for 60% of the country's large companies" — (Hamilton 1999, p. B8) would tend to lead most readers to think that skill shortages are an important problem in the Canadian labour market. However, if one follows up this story

one finds that *no* questions on current vacancies were asked on the proprietary survey being reported, and no information is publicly available to enable the assessment of the survey's reliability.[7] Somewhat earlier, an Angus Reid email survey of members of the Canadian Advanced Technology Association found that a majority of respondents had unfilled vacancies, but no vacancy total or vacancy rate is possible because the survey did not ask any questions about how many vacancies, and it is quite unclear how to represent the sample frame (CATA numbers).[8]

Anecdotal discussion of vacancies often comes back to the high-tech sector, see Evans (1999, p. B8). The underlying survey found that the 34 high-tech companies that participated expect to have 7,848 vacancies over the next two years (extrapolated to 30,000 for the sector as a whole). In this case, the newspaper headline is based on total anticipated future gross hiring — it takes a follow-up enquiry to produce the information that the survey found 2,298 currently available vacancies[9] which might correspond to the currently available stock of unemployed persons. As a percentage of current employment at the sampled firms, that represents 2.87 percent. This might be seen as setting an upper bound to possible vacancy rates in the economy as a whole. Experience in the high technology sector undoubtedly cannot be generalized to other less rapidly growing sectors (vacancies are mostly for occupations for which industry experience is crucial: Project Manager, Senior Software Engineer, Web Developer/Designer, Quality Assurance Analyst/Test Engineer).[10]
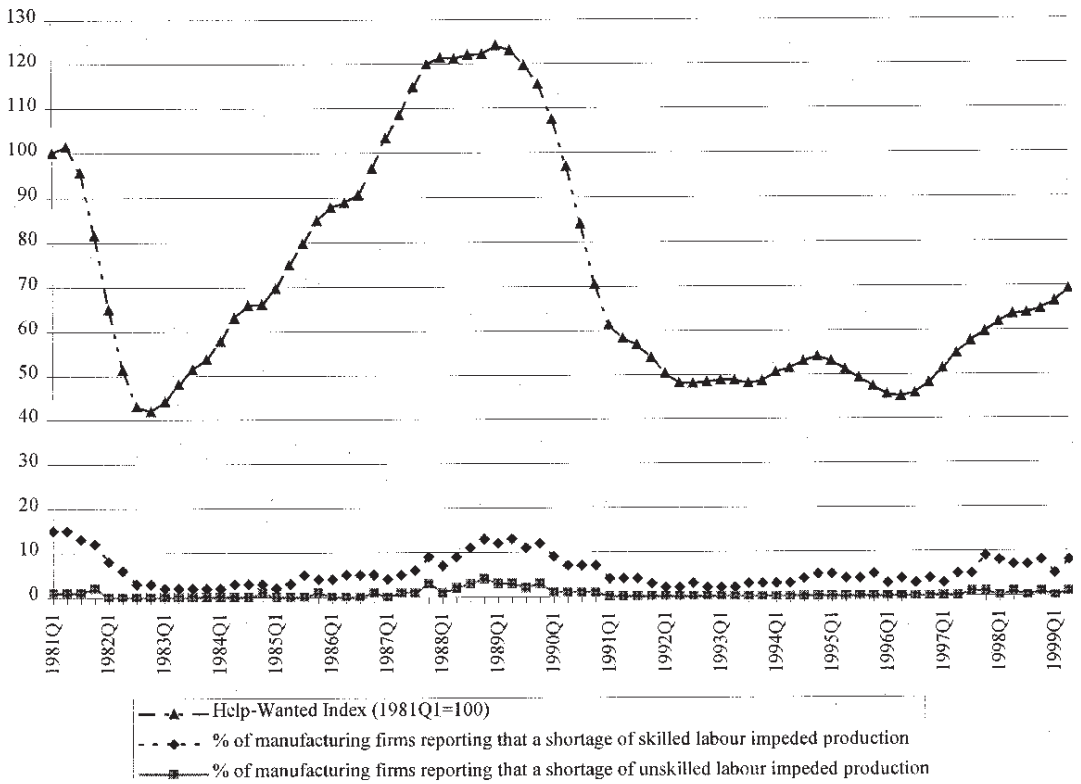
Tracking down the source of assertions of labour shortages can sometimes be a bit like tracking the origins of an urban legend. Successive advocacy documents repeat striking statistics, with the gradual shedding of qualifying phrases. In Nova Scotia, for example, the Labour Market Development Secretariat reports "According to the 1998 Nova Knowledge *Information Economy Report Card,* 60 percent of Halifax firms surveyed in 1997 had trouble recruiting skilled employees" (1999*a*, p. 8;

1999*b*, p. 34). This number can indeed be found in the Nova Knowledge document (1998, p. 8). However, the source is a survey conducted by the Greater Halifax Partnership (1997) which asked the question "How much difficulty do you have recruiting skilled employees?" No definition of "difficulty" is provided and it appears that the 60 percent statistic is the sum of those who answered "some," "a fair amount" and "a lot."[11] However, it is not clear what having "some" difficulty in recruiting skilled employees means (if it means that the firm had to interview several applicants before finding an ideal candidate, for example, this may not be much of a crisis at all). As well, since a successful search ef-

fort often precedes the desired start date of a job, even with "a fair amount" or "a lot" of difficulty there may be no corresponding vacancy at all.

The episodic and fragmentary nature of such occasional local[12] or industry-based surveys means that even if these sorts of measures are correlated with aggregate vacancies, observers have little way of detecting trends. However, Statistics Canada has asked manufacturers questions on "sources of production difficulties" since 1981.[13] Figure 1 presents the percentage of manufacturing establishments reporting that "skilled labour shortage" or "unskilled labour shortage" was an impediment to production.

FIGURE 1

Indicators of Labour Demand, 1981:Q1 to 1999:Q2

— ▲ — Help-Wanted Index (1981Q1=100)

- - ◆ - - % of manufacturing firms reporting that a shortage of skilled labour impeded production

——■—— % of manufacturing firms reporting that a shortage of unskilled labour impeded production

This time series has a plausible correlation with the macroeconomic cycle, and other indicators of labour demand. However, the absolute fraction of manufacturing establishments reporting that labour shortages impeded production is very low (in the second quarter of 1999, only 8 percent of manufacturers reported that skilled labour shortages impeded production, and the percentage reporting unskilled labour shortages was a mere 1 percent). Presumably, available vacancies are concentrated in the 8 percent of manufacturing firms that need skilled workers for production, but since neither the size of the employer nor the number of workers needed is reported, one cannot translate this time series into a vacancy rate. Furthermore, since there is no time dimension to the question in this quarterly survey, there is no way of knowing whether an unfilled job or shortage of overtime hours caused problems for a few hours, days, or for longer.

The Workplace and Employee Survey (1996)
In 1996, Statistics Canada collected data from 748 employers using a stratified random sample design based on Statistics Canada's Business Register. As a relatively current indicator of the level of vacancies, this survey is the best available because respondents were drawn from a variety of industrial sectors across Canada (not just the high-tech sector or a single locality). As well, the question directly asked for the total number of current vacancies and the number unfilled for four months or longer.[14] An especially useful feature of this survey is that it can distinguish between the percentage *of firms* that are looking for workers or that have vacancies, and vacancies as a percentage *of the workforce*. In the WES, a fifth of all establishments reported active recruitment activities at the time of the survey, but this is a long way from meaning that vacancies were commonplace. Although some 10 percent of establishments reported some unfilled positions, these were equivalent to about 1 percent of the workforce at the time of the survey (Statistics Canada, 1998, p. 79).

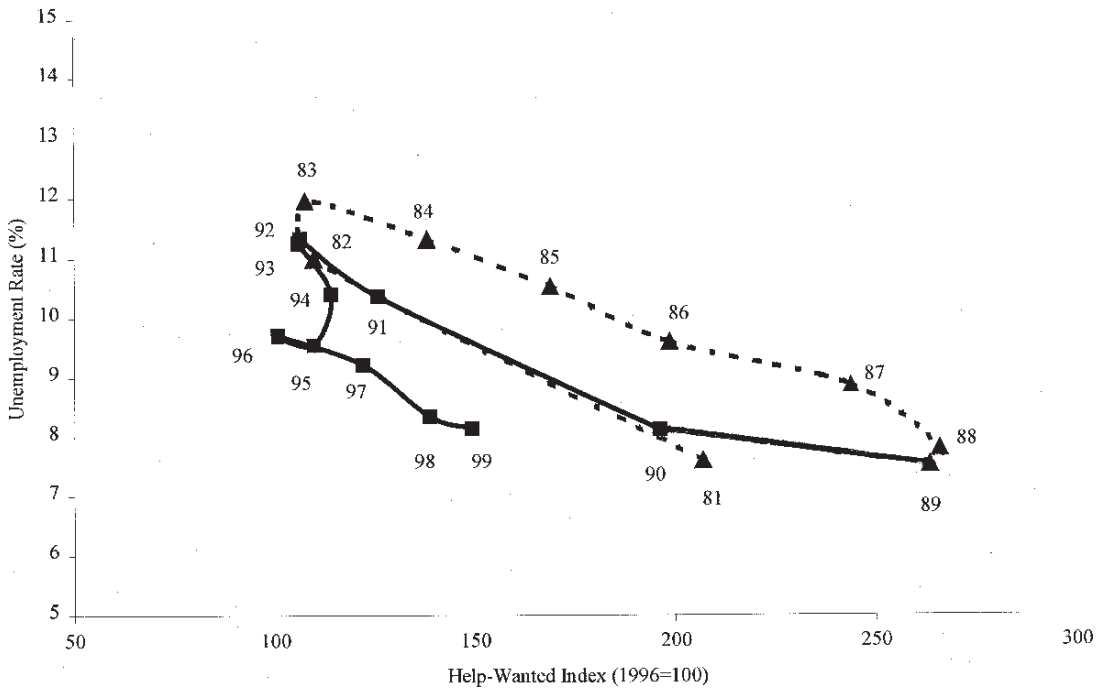This estimate is consistent with a 1995 survey of Quebec employers by HRDC/SQDM, which found

30,400 vacancies, equal to about 1.48 percent of paid employees (or around 1.14 percent of the labour force) at the time. However, in the Quebec data, only 17 percent of vacancies were considered to require a high level of skills, suggesting that a high proportion of vacancies represent normal turnover of workers among establishments (see Roy, Henson and Lavoie 1996, p. 40).[15] Moreover, as the survey noted "These problems do not appear to have a dramatic impact on the activities of the business. Production delays, an increase in overtime and higher salaries were each mentioned by 10% or less of establishments which indicate having recruiting problems. The most prevalent recruiting problem is an extension of the hiring period."[16]

If it is accepted that in a dynamic economy, some jobs are always coming empty and time may be required for them to be filled, one might want to distinguish analytically between "frictional" and "structural" vacancies. The corresponding empirical distinction is not easy to draw, but long duration vacancies for skilled labour may be a reasonable approximation. In the WES, only three vacancies in ten, or 0.3 percent of the workforce, had been unfilled for four months or more — "a relatively modest figure" (Statistics Canada 1998, p. 79).

The Help-Wanted Index/Unemployment Rate Relationship
Statistics Canada has been producing a Help-Wanted Index (HWI) since 1962,[17] which has frequently been relied on for evidence of vacancy trends (e.g., Reid and Meltz 1979; Archambault and Fortin 1997). Over time the HWI moves in almost perfect opposition to the unemployment rate. Writing in 1991, Gera, Rahman and Arcand used the (HWI) to argue that structural unemployment had risen in the 1980s. Using the correlation observed between direct measures of vacancies available from the Job Vacancy Survey and the HWI in the 1970s, they concluded that the HWI was a good proxy for available vacancies but that the relationship between it and the unemployment rate had changed significantly over the period 1966 to 1988. Figure 2 charts the

Unemployment Rate and Help-Wanted Index, 1981 to 1999 (annual average)

Note: Average of the first eight months for 1999.

relationship observed between the HWI and the unemployment rate in Canada.[18]

As Figure 2 indicates, there may have been a significant shift outwards in the Help-Wanted Index-unemployment rate relationship during the 1980s, which Gera *et al.* saw as indicative of growing structural imbalances.[19] They argued that growing interregional disparities and the scarring effect of increasingly prevalent long-term unemployment were responsible for this increase in structural imbalances.[20]

Whatever happened to the HWI-unemployment rate relationship in the 1980s, the 1990s have been very different. It is clear that this relationship has

shifted inwards during the 1990s, to such an extent that all of the outward shift of the 1980s has been reversed, and then some.[21]

Although Figure 2 may be highly suggestive of a shift outwards, and then inwards, of the Beveridge curve, Blanchard and Diamond (1989) have stressed the idea that the Beveridge curve is really a clockwise loop in unemployment/vacancy space. The original work of Gera, Rahman and Arcand (1991) relied heavily on the econometric finding of a positive and statistically significant time trend in estimates of the unemployment rate-HWI relationship. We therefore have replicated their specification, and nested it within the broader

Test of Shift in the Relationship between Unemployment Rate and Help-Wanted Index
(Dependent Variable = Unemployment Rate)

Indep. Var.	1981:01 - 1999:08		1981:01 - 1983:12 and 1990:01 - 1992:12		1984:01 - 1989:12 and 1993:01 - 1999:08	
	Coefficient	T-Ratio	Coefficient	T-Ratio	Coefficient	T-Ratio
Constant	17.948	25.49	22.143	25.03	19.981	22.73
1990s	-1.5933	-12.13	-0.0334	-0.31	-2.9195	-16.02
HWI	-0.0563	-6.96	-0.1172	-9.71	-0.0661	-7.32
$(HWI)^2$	0.000082	3.69	0.000248	6.61	0.000091	3.99
R^2	0.76		0.95		0.84	
N	224		72		152	

Note: All regressions include eleven monthly dummy variables to control for monthly variations.

specification that the time trend of the relationship may have shifted in the 1990s (see Osberg and Lin 1999, Appendix C).

Because the period between 1981 and 1999 spans different phases of the business cycle, we want to test if the HWI-unemployment rate relationship shifts differently during downturn phases from recovery and expansion periods. Hence, we estimate the unemployment rate as a function of the HWI and the HWI squared, controlling for monthly variations, for three time periods: 1981:01-1999:08 (the entire empirical period); 1981:01-1983:12 and 1990:01-1992:12 (downturns); and 1984:01-1989:12 and 1993:01-1999:08 (upswings). Test of shifts is implemented with the use of a dummy variable indicating the 1990s. Results are reported in Table 1. While the downturn periods show no shift in the HWI-unemployment rate relationship, both the entire period and the upswing periods exhibit a pronounced inward shift in this relationship for the 1990s.

As column 1 of Table 1 indicates, taking upswing and downturn periods together, a 1.6 percentage point lower unemployment rate is observed in the

1990s, compared to the 1980s at any given level of the HWI. However, the hypothesis that there is no difference between the inward shift of the Beveridge curve in the upswing and downturn phases of the business cycle is nested within the test for structural differences (and rejected by the data). As well, Blanchard and Diamond (1989) offer a convincing model of why one might expect structural differences in different phases of the business cycle. We therefore prefer the estimates of column 5, which indicate that in comparison to the 1980s, in the 1990s a 2.9 percentage point lower unemployment rate is observed for any given level of the HWI.

The Help-Wanted Index and the Number of Vacancies
Although trends in the HWI may be a good indicator of trends in available jobs, the HWI is itself an *index* and not a direct measure of vacancies. The question remains: "How many *vacancies* are now available in the Canadian labour market?" Repeated, national measurement of the number of vacancies in Canada ceased in 1978. However, Figure 2 and the regression results summarized in Table 1 indicate that by 1999 the matching efficiency of the Canadian

labour market was at least as good as it was in 1981. If so, then data from the Job Vacancy Survey of that period may still be highly relevant to predicting the level of vacancies in the Canadian labour market (see next section).

An alternative methodology, proposed by Sharpe (1999) and the Canadian Labour Market and Productivity Centre (1988), is to use the HWI as a scaling factor which predicts the percentage change in vacancies, and to assume that vacancies were equal in number to the unemployed in a base year (1966). This methodology produces the estimate that unfilled vacancies amounted to about 2.3 percent of the labour force in 1998, equivalent to 30 percent of total unemployment.[22]

This estimate of vacancies is effectively higher than the Branham Group's estimate of the 1998 vacancy rate in the information and telecommunications technology (ICT) industry, since it is expressed as a percentage of the labour force. In 1999 approximately 25 percent of the Canadian labour force was either unemployed or self-employed. Hence, if one is to compare the Branham estimate of 2.87 percent as the vacancy rate (expressed as a percentage of employees) among high technology companies, the Sharpe estimate corresponds to 3.06 percent of paid employees. (Alternatively, if the estimate of the high technology vacancy rate is to be compared to the unemployment rate — which is calculated as a proportion of the labour force — the Branham estimate has to be scaled down to 2.15 percent of the labour force.)

However, it might easily be thought that it is unlikely that the vacancy rate in the rest of the economy is actually significantly *higher* than in the high technology sector.

The Vacancy Rate–Help-Wanted Index Relationship

If *changes* in the HWI are a good proxy for *changes* in the vacancy rate, the vacancy data from the Job Vacancy Survey (JVS) may be useful for establishing the *level* of vacancies. There are three steps to our approach: (i) since the methodology of the HWI now in use differs somewhat from that in use when the JVS was conducted, we establish the empirical relationship between the "old" and the "new" HWI; (ii) we estimate the relationship between vacancy rates derived from the 1971-78 JVS and the old HWI (controlling for seasonal variations and regional differences); (iii) we predict vacancy rates in the 1980s and 1990s using the new HWI based on the relationships established in (i) and (ii).

From 1962 until 1989, the "old" HWI was produced, and since 1981 Statistics Canada has published another series, the "new" HWI. The two series overlap between January 1981 and December 1988 and data constructed using both the old (measuring the column space of help-wanted ads) and the new (counting the number of help-wanted ads) methods are available for these eight years. Previous research shows that the two series follow each other very closely at the national level in spite of the differing methodology. Shifting the two series from a lag of up to five months to a lead of up to eight months, Haggar-Guenette (1988) finds the cross-correlation coefficient between the two series ranges from 0.86 to 0.99. When the two series are related to the employment-population ratio or the unemployment rate, very similar cross-correlation coefficients are found with respect to each of the two series. Furthermore, the monthly raw data at the national level show that the two series follow nearly an identical pattern, with a correlation coefficient of 0.98. When the old HWI is regressed on the re-based new HWI without a constant term, we obtain a coefficient of 0.96 at the national level with a t-ratio = 82 (number of observations = 96). When the monthly data are pooled across the five regions and the old HWI is regressed on the re-based new HWI without a constant term, OLS produces a coefficient of 0.93 with t-ratio = 137 while full-pooling GLS produces a coefficient of 0.97 with t-ratio = 65 (number of observations = 480).

The Canadian JVS began operation in 1971 and was discontinued after 1978. The JVS was conducted twice a month through a sample survey among employers representing approximately 90 percent of total employment, covering all industrial sectors except agriculture, fishing and trapping, domestic service, and the non-civilian component of public administration and defence. A feature of the sample design was the rotation of the sample to avoid an undue reporting burden on the survey respondents. The sample was in the form of two replicated sub-samples to provide simple variance estimates based on the differences between the two sub-samples. The population of job vacancy reporting units (JVRUs) was divided into five sectors: ES-1 consisting of business establishments with 20 or more employees; ES-2 consisting of business establishments with 19 or fewer employees; educational and other institutions; federal and provincial governments; and municipal governments.[23]

Job vacancies in the JVS were defined analogously to unemployment, that is, position openings had to meet four criteria: (i) available immediately; (ii) employers had undertaken, within four weeks prior to the reference date, some specific recruiting action to fill the positions (e.g., advertised, contacted Canada Manpower Centres, interviewed walk-ins); (iii) vacant for the entire reference day; and (iv) open to people outside the establishment. Certain types of position openings were thus excluded: (i) openings that had a future starting date and hence were

TABLE 2

Summary Statistics and Regression Results on Vacancy Rates

	Summary Statistics	
Variable	Mean	Standard Deviation
Vacancy Rate (per 1,000 employees)	7.681	3.710
Help-Wanted Index	84.687	30.917
N	160	

	Regression Results (Dep. Var. = Vacancy Rate)			
	OLS		Full-Pooling GLS	
Explanatory Variable	Coefficient	T-Ratio	Coefficient	T-Ratio
HWI	0.2924	6.12	0.2227	4.64
$(HWI)^2$	-0.00104	-4.29	-0.00071	-3.11
Q2	1.2602	2.08	1.0355	3.20
Q3	1.6884	2.79	1.6508	4.39
Q4	-0.3068	-0.50	0.0236	0.07
Atlantic	-2.8850	-3.96	-3.0474	-2.12
Quebec	-4.1787	-5.06	-4.3753	1.98
Prairie	4.1594	6.06	3.1891	1.91
BC	3.2086	3.87	2.5837	2.04
Constant	-9.3820	-4.03	-6.0619	-2.52
R^2	0.50		0.35	

not "immediately available"; (ii) openings for which no recruiting action was undertaken or recruiting action ceased four weeks prior to the reference day; (iii) openings that could be filled immediately from employers' or unions' waiting list and thus were not "vacant for the entire reference day"; (iv) positions that were open only to employees of the firm (either working or on temporary layoff) and hence not "open to people outside the establishment." In order to estimate the relationship between job vacancies derived from the JVS and the old HWI from 1971 to 1978, we pool the quarterly data across the five regions and estimate the vacancy rate as a function of the HWI and the HWI squared, controlling for quarterly (seasonal) as well as regional variations.

Table 2 reports summary statistics and regression results on the above-mentioned vacancy rate model from the first quarter of 1971 to the last quarter of 1978. Other things being equal, job vacancy rates generally rise with the HWI. Seasonality is also evident, vacancy rates are higher in the spring and summer (second and third quarters). There are also regional variations — vacancy rates are lower in Atlantic Canada and Quebec than in Ontario, but higher in the Prairie provinces and British Columbia.

Figure 3 charts the raw vacancy rate against the fitted ones using the regression results evaluated at the national level and shows that the vacancy rate for this period is indeed modelled quite well.

The third and final step is to use the new HWI to predict job vacancies for the 1980s and 1990s based on the relationships established in the above two processes. The results are reported in Table 3. It appears that job vacancies peaked during the expansion in the late 1980s, amounting to 1.0-1.1 percent of paid employment or 0.8-0.9 percent of the labour

FIGURE 3
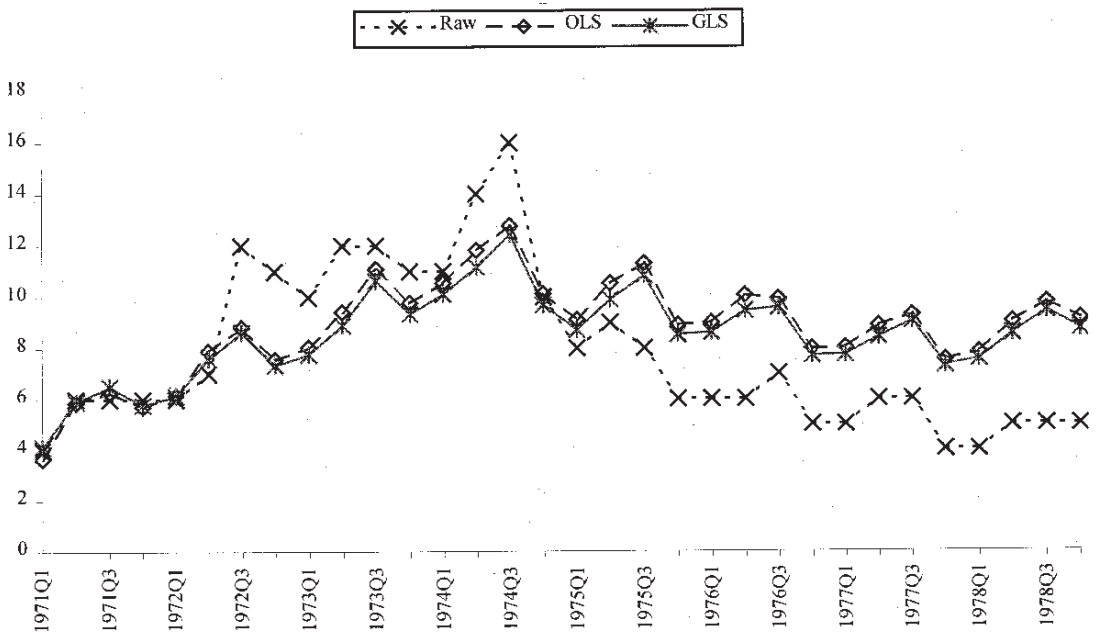Raw and Fitted Vacancy Rates, 1971:I to 1978:IV

TABLE 3
Predicted Job Vacancy Rates, 1981 to 1999

	% of Employees		% of Labour Force			% of Employees		% of Labour Force	
	OLS	*GLS*	*OLS*	*GLS*		*OLS*	*GLS*	*OLS*	*GLS*
1981	0.92	0.88	0.74	0.70	1990	0.87	0.83	0.68	0.66
1982	0.29	0.35	0.22	0.27	1991	0.42	0.46	0.32	0.35
1983	0.27	0.33	0.21	0.25	1992	0.26	0.33	0.20	0.25
1984	0.52	0.53	0.39	0.41	1993	0.26	0.32	0.19	0.24
1985	0.72	0.71	0.55	0.54	1994	0.33	0.38	0.25	0.29
1986	0.88	0.84	0.69	0.66	1995	0.29	0.35	0.22	0.27
1987	1.05	1.00	0.82	0.79	1996	0.21	0.28	0.16	0.21
1988	1.09	1.06	0.87	0.84	1997	0.39	0.43	0.29	0.32
1989	1.09	1.05	0.87	0.84	1998	0.52	0.54	0.39	0.41
					1999	0.60	0.60	0.45	0.45

Note: Average of the first eight months for 1999.

force. As far as job vacancies are concerned, the latest recovery is not even close. Predicted job openings for 1998-99 stand at 0.5-0.6 percent of paid employment or 0.4-0.45 percent of the labour force, only about half of that in the late 1980s.

CONCLUSION

Table 4 summarizes our results. However, one reaction might be scepticism: Are vacancies too problematic in conception and too difficult to measure empirically for total "available jobs" ever to be measured accurately? If so, then the structural component of unemployment cannot be measured independently of the aggregate total of unemployment which the structural mismatch hypothesis seeks to explain, and the mismatch argument becomes clearly circular. In this case, the term "structural unemployment" should be banished from the economist's vocabulary[24] and replaced by the more accurate terms "predicted unemployment" (when the expected level of unemployment conditional on an estimated structural relationship is

meant) or "long-term average unemployment" (when that is meant).

It is not clear, however, why a "vacancy" on the firm side of the labour market is inherently more difficult to measure than "unemployment" on the worker side of the market. After all, since firms typically employ multiple workers, the average firm is more often engaged in the search process than the average worker.[25] On both sides of the market, an unfilled match is costly and market participants have an incentive to recognize and correct the situation, so firms do in general know when vacancies exist. Although there may be some ambiguity for both workers and firms in estimating when search is serious, and at what wage rate a match would be acceptable, there does not seem to be any grounds for a presumption that employers are less capable or less honest than individual workers in answering surveys (see Abraham 1983, 1987).

In fact, vacancies are routinely measured in some countries. In a number of countries, administrative data on job-placement services are used, since in

Vacancy Rate Estimates

Author/Date	Methodology	Sample Frame	Vacancies/ Employees %	Vacancies/ LF %
Branham Group 1998[a]	Survey – 34 firm respondents	Leading ICT firms [ICT=2.7% of labour force]	2.87	2.15
Sharpe 1999	Assume vacancies = unemployed in 1966; update by HWI	Canadian labour force		2.30
Statistics Canada Workplace and Employee Survey 1996[a]	Stratified random sample of firms – 748 respondents	Cross-section of Canadian firms	1.00	0.75
Osberg and Lin 1999[b]	Scale up Job Vacancy Survey by Help-Wanted Index	Canadian paid employees	0.60	0.45
HRDC/SQDM 1995	Survey	Quebec employers (with 5 or more employees)	1.48	1.14

Notes: [a]Vacancy rate originally calculated as percentage of paid workforce, scaled down by a factor of 0.75 to reflect paid employees as a percentage of the total labour force.
[b]Average of the first eight months for 1999.

some contexts such data provide a more comprehensive picture of the labour market than would be the case in Canada. In the Netherlands, for example, employers have also been surveyed regularly since 1973 (with questionnaire revisions in 1980 and 1988), see Muysken (1994, p. 22).

The measurement of vacancies is important for microeconomic labour market policy design and macroeconomic policy settings. Vacancies and the extent of structural unemployment could be systematically measured in Canada, but are not. The obvious conclusion is that perhaps it is time to get some better information on Canadian vacancies. As noted in the section on miscellaneous surveys, statistics on "labour shortages" are now being used in the policy debate, but the problem is that journalists often use very poor statistics, whose implications may be quite misleading. Since the cost of better information is likely to be small compared to the cost of bad policy based on bad statistics, perhaps it is time to invest in some more knowledge about the extent of structural unemployment in Canada.

The key idea underlying the concept of "structural unemployment" in labour economics is that some unemployed people are unable to accept *available jobs* because they do not have the right skills, or are in the wrong place. This paper has therefore looked for evidence on the number of unfilled vacancies in the Canadian economy. Since some vacancies are due to normal turnover, and are quickly

filled, the number of vacancies must be seen as an upper bound on the extent of structural unemployment, but the vacancy rate is not high, in any event.

Available surveys of the Quebec and Canadian labour markets in 1995 and 1996 put the vacancy rate at about 1.14 percent and 0.75 percent of the labour force. This paper has presented evidence that the Canadian Beveridge Curve has shifted in, during the 1990s, after shifting out during the 1980s. Evidence from the Job Vacancy Survey is therefore relevant. If projected to the 1990s, that evidence indicates the vacancy rate is about 0.45 percent of the labour force.

In a dynamic economy, some sectors are always growing faster than others, and have the growing pains to match. Although the "high technology" sector may have a vacancy rate of as much as 2.8 percent of employees (equivalent to 2.2 percent of labour force), this sector is very small as a proportion of total employment and its vacancy rate is certainly much higher than that in the economy as a whole.

At the time of writing (October 1999), the best evidence is that less than one-eighth of the national unemployment rate could be due to structural mismatch between the skills demanded in *available jobs* and the skills possessed by the unemployed. We would emphasize that this paper has considered only the unemployment rate and the vacancy rate. The processes underlying wage formation and price determination have *not* been considered, and we have presented no direct evidence on the level of unemployment at which upward pressure on wages and prices could be expected. What we have done is provide another piece of evidence that high unemployment in the 1990s is *not* the result of structural mismatch. We would suggest that if macroeconomic decisionmakers in Canada want to come up with reasons to continue a restrictive monetary stance in future, or to justify decisions to restrain aggregate demand in the past, a better rationale than exaggerated notions of mythical shortages of labour is needed.

NOTES

[1]More exactly, the extent of structural unemployment matters for those estimates of potential output that have an underlying economic content — see Dupasquier, Guay and St-Amant (1997) for alternative examples of purely statistical methodology. On the other hand, although disagreeing on some other issues, both Jackson (1998) and Sargent and Sheikh (1996) would agree on the potential importance of structural mismatch for macroeconomic policy.

[2]Finance Canada's Web page http://www.fin.gc.ca/glosse/gloss8e.html. Appendix A of Osberg and Lin (1999) reproduces a sampling of the definitions found in macroeconomics and labour economics texts. Note that in labour economics, "unwilling to work at the wage rate offered in the market" is not normally part of the definition.

[3]See, for example, Abel, Bernanke and Smith (1999, p. 94).

[4]The number of immediately available vacancies is an upper bound to the extent of structural unemployment because even if all the unemployed were in the location where jobs were available, had the skills demanded and were willing to accept the wage offered, it might still take time for workers and firms to match up with each other.

The time that firms require to search for suitable workers implies that some vacancies are "frictional" in the same way (and for the same reasons) that some unemployment is "frictional." In addition, the Finance Canada definition classifies as structurally unemployed those workers "unwilling to work at *the* wage rate offered in the market" (Emphasis added). Firms that have positions available at substantially less pay than the going market wage (or with substantially poorer working conditions) may advertize "vacancies." However, although one might reasonably call such vacancies with below market pay rates "structural vacancies," the unemployed who refuse such substandard jobs (but who would accept at the market wage) are not "structurally" unemployed.

Although the WES data distinguishes between long-duration and short-duration vacancies and might be seen as approximating a frictional/structural distinction in vacancies (see next section), this paper does not attempt to subtract the number of frictional and substandard vacancies from "available jobs."

[5]Using the 1986 Labour Market Activity Survey, Osberg (1991, p. 1710) estimated that 65 percent of interindustry mobility in Canada occurred without any intervening period of unemployment.

[6]Evans (1999, p. B8) reports on a survey of 34 high-tech companies that currently have 80,000 employees, or 20 percent of the high-tech workforce in Canada. No further definition of "high-tech" is provided (and the concept is inherently ambiguous), but the article goes on to estimate high-tech employment as 400,000,which is approximately 2.7 percent of current employment in Canada.

[7]The survey in question was conducted by International Data Corporation and results are available for CA$3,500. The wording of questions asked and the construction of the sample frame used are not publicly available, but a telephone inquiry elicited the information that there was a 20 percent response rate to a mail-back survey of "large" companies. Apparently, the concept in use is "project delay" but what exactly this means and what reliance can be placed on the survey, are not possible to assess.

[8]See http://www.angusreid.com/pressrel/Cata_jun41997.html.

[9]Personal communication, Mary Rother, Vice President, Branham Group, 6 April 1999.

[10]See Branham Group (1999, p. 3), available from the ITAC web page http://www.itac.ca.

[11]See Greater Halifax Partnership (1997, p. 65). The survey was a mail-back using the Business Occupancy Tax List for the municipality as the sampling frame. The majority of respondents had less than five employees and only 40 (9.1 percent) had 50 or more employees. The underrepresentation of employers of significant size makes it highly unclear how one can generalize from recruitment "difficulties" to employment vacancies.

[12]The Small Business and Special Survey Division of Statistics Canada has conducted a series of special labour market surveys at the firm level concentrating on wage and salary information for a number of provinces in the 1990s (e.g., the 1998 Wage and Salary Survey for Saskatchewan and Prince Edward Island, the 1996-97 Wage and Salary Survey for Saskatchewan and Manitoba). Possible measures of vacancy issues are addressed in two questions: "How many workers presently in this occupation do you expect will vacate their positions over the next 12 months?" and "How many additional workers do you expect to hire in this occupation over the next 12 months?" The first is really an expected turnover question, and the second is really an expected hiring question. Both are somewhat related to vacancies, but not the same concept at all.

[13]Available on CANSIM Matrices 2843-2845; The exact question asked is: "Are the production activities of this establishment impeded by difficulties in any of the following areas?" — shortage of skilled labour and shortage of unskilled labour are the first two options specified, followed by shortage of raw materials (mentioned by 13 percent in January 1999), working capital, other, and none.

[14]The establishment is first asked whether there "are any vacant positions currently unfilled" and if so, the respondent is asked to fill in a form specifying "The number of vacancies that, despite active recruitment, have been unfilled for less than four months or more than four months," for four broad occupation groups and "other." Note that this does not necessarily imply that the position is immediately available. Hence, the derived estimate (1 percent of employees or about 0.75 percent of the labour force) does not directly correspond to the stock of currently unemployed. As might be expected, most vacancies were for technical (35 percent) and professional

[15] A summary is available at http://www.qc.hrdc-drhc/socio-97/moueuvre/anglais/sect_5/sect_5.html.

[16] http://www.qc.hrdc-drhc.gc.ca/socio-97/moeuvre/anglais/sect_5/sect_5.html.

[17] Two statistical series have been published, the first from January 1962 to December 1988 and the second from January 1981 until the present day. Over the overlap period 1981 to 1988 the two series are nearly perfectly correlated, see below.

[18] The Help-Wanted Index is adjusted by the working-age (15+) population throughout the paper.

[19] Gera, Rahman and Arcand (1991, p. 44). They also rely heavily on the finding of a statistically significant time trend in regression estimates of the Help-Wanted Index-unemployment rate relationship.

[20] Interestingly, they reject explanations based on generosity of the unemployment insurance system because "the evidence suggests that the UI system became less generous during the 1980s compared with the mid-1970s and that, as a result, ... the unemployment/vacancy relationship should therefore have shifted inward, not outward as it did in fact" (Gera *et al.* 1991, p. 22). This contrasts with Reid and Meltz (1979) who argued that the 1971 revisions to UI were largely responsible for a shift outward in the Beveridge curve from the mid-1960s to the mid-1970s. If the Reid and Meltz position is correct, the 1990s revisions to UI/EI (which have put the system back to 1950s levels of generosity) should have substantially shifted the Beveridge curve in. Similarly, Gera *et al.* (1991) argue that employment protection laws, minimum wages and unionization rates have the "wrong" trend to explain rising structural imbalances in the 1980s. They conclude "a job vacancy survey would assist policy makers in analyzing the growing mismatches between unfilled job vacancies and the attributes of the unemployed.... The cost of providing such data would possibly not be more than the cost incurred by misguided policies pursued without the insights the job vacancy data might provide" (1991, p. 45).

[21] Which appears (see Gera *et al.* 1991, p. 6) to be essentially identical to the late 1970s. See also Fortin (1999, p. 1088).

[22] See Torjman and Battle (1999, p. 14).

[23] Within each sector, the population of JVRUs was stratified by location, industry, and size. Within each stratum, JVRUs were assigned at random to a given number of panels and within a panel to two subpanels. The subpanel designations controlled the sample replication mentioned earlier. Details of the sample design are provided in Statistics Canada, *Annual Report on Job Vacancies 1978*, Cat. No. 71-203. Detailed discussions of conceptual and definitional issues are given in Ostry and Sunter (1970). In the JVS, job vacancies were grouped into three categories: all vacancies — for full-time, casual, part-time, seasonal and temporary jobs; vacancies for full-time jobs — for jobs with a minimum duration of four full standard work weeks or one full standard work month; longer-term vacancies — for full-time jobs that had not been filled for one month or longer. We use the category of all vacancies in our analysis. The JVS measured unfilled vacancies at six points in time throughout the quarter which were averaged to provide quarterly estimates. A short reference period (one day) was selected to make it easier for respondents to recall vacancies. Thus, the estimates are best interpreted as an approximation of the general level of vacancies at any given day in the quarter. Estimates of vacancies were obtained by multiplying totals of vacancies in different response categories in each stratum by appropriate weights for whatever the desirable level (e.g., Canada as a whole, a specific province, a specific industry, or a specific occupation). Job vacancy rates were then obtained by expressing the number of vacancies per 1,000 existing jobs. A detailed description of the estimation procedure is provided in Statistics Canada, *The Canadian Job Vacancy Survey: Technical Appendix*, Cat. No. 71-521.

[24] The "mismatch" definition of structural unemployment has the distinctive advantage that an upper bound to the level of "structural" unemployment can be independently derived, *if* data on vacancies ("available jobs") can be found. It is clearly circular to argue that persistently high levels of unemployment are "structural" in nature, if structural unemployment is *defined* to be persistent unemployment. Defining structural unemployment to be "equilibrium" unemployment has the disadvantage of ignoring entirely the extent of frictional unemployment in short-term job search (for which entirely different microeconomic labour market policies are appropriate). As well, there is the difficulty of assessing what equilibrium unemployment might be (or which equilibrium, if there is more than one).

Part of the confusion in usage of the term "structural unemployment" may arise because econometricians have long referred to the "structural form" of macroeconomic models (e.g., Johnston 1972, p. 4). Estimation of a model of aggregate unemployment can be used to yield a predicted level of unemployment which might be labelled "structural," in the sense of being the rate of unemployment that is predicted by the structural parameters of the model and the current value of exogenous variables. It is clear, for example, that the IMF has often used the term "structural unemployment" in this sense. (See Prasad 1994; or Van Rijckeghem 1993).

However, the structural estimating equation for unemployment might well include the effects of many influences which have nothing to do with unfilled "available jobs" — such variables as seasonal dummies, the US unemployment rate, the youth percentage of the labour force, etc. Although the same word (structural) occurs, this is a fundamentally different concept from the "mismatch" concept, but when this is not recognized, macroeconomic analysts can often shift casually from one meaning of the term "structural" to another.

[25]For both firms and workers, explicit search may not be needed to initiate a job match. Workers may move directly from not in labour force status to employment, if approached directly by an employer (see Osberg 1993) and firms may similarly create a vacancy for a promising worker (see Granovetter 1974). However, both firms and workers can also identify when they are actively searching for a match.

REFERENCES

Abel, A., B. Bernanke and G. Smith. 1999. *Macroeconomics*, 2d Canadian ed. Don Mills, ON: Addison-Wesley.

Abraham, K. 1983. "Structural/Frictional vs. Deficient Demand Unemployment: Some New Evidence," *American Economic Review* 73(4):708-24.

____ 1987. "Help Wanted Advertising, Job Vacancies, and Unemployment," *Brookings Papers on Economic Activities* 1:207-48.

Archambault, R. and M. Fortin. 1997. "The Beveridge Curve and Unemployment Fluctuations in Canada," Working Paper No. W-97-4E. Ottawa: Applied Research Branch, Human Resources Development Canada.

Blanchard, O.J. and Diamond, P. 1989. "The Beveridge Curve," *Brookings Papers on Economic Activity* 1:1-60.

Boothby, D. 1995. *COPS: A Revised Demand Side*, Technical Document T-95-4. Ottawa: Applied Research Branch, Human Resource Development Canada.

Branham Group Incorporated. 1999. *IT Skills Shortage in Canada - A Snapshot*, report prepared for the Information Technology Association of Canada, 4 February 1999. Unpublished paper. (available from the ITAC website - www.itac.ca).

Burdett, K. and E. Cunningham. 1994. "The Duration of a Vacancy," in *Measurement and Analysis of Job Vacancies: An International Comparison*, ed. J. Muysken, pp. 147-68.

The Canadian Labour Market and Productivity Centre. 1988. "The Nature of Current Unemployment: Evidence from Job Vacancy Information," *Quarterly Labour Market and Productivity Review* (Spring):31-34.

Dupasquier, C., A. Guay and P. St-Amant. 1997. "A Comparison of Alternative Methodologies for Estimating Potential Output and the Output Gap," Working Paper No. 97-05. Ottawa: Bank of Canada.

Evans, M. 1999. "High Tech Sector Expected to Add 30,000 Jobs in Two Years," *The Globe and Mail: Report on Business*, 10 February 1999, p. B8.

Fortin, P. 1999. "The Great Canadian Slump, a Rejoinder to Freedman and Macklem," *Canadian Journal of Economics* 32(4):1082-92.

Gera, S., S. Rahman and J. Arcand. 1991. "Structural Imbalances in Canadian Labour Markets," Working Paper No. 18. Ottawa: Economic Council of Canada.

Granovetter, M.S. 1974. *Getting a Job: A Study of Contacts and Careers*. Cambridge, MA: Harvard University Press.

Greater Halifax Partnership. 1997. *Listening to Business 1997*. Halifax: Halifax Regional Municipality, unpublished paper.

Haggar-Guenette, C. 1988. "The 'Old' and the 'Revised' Help-Wanted Index: A Comparison," *Help-Wanted Index 1988*, Cat. No. 71-204. Ottawa: Statistics Canada, pp. 33-35.

Hamilton, T. 1999. "Tech Skill Shortage Hurts Firms," *The Globe and Mail: Report on Business*, 19 January, p. B8.

Henson, H. and C. Newton. 1996. *Tools and Methods for Identifying Skill Shortages: A Cross-Country Comparison*, Technical Document T-96-3E. Ottawa: Applied Research Branch, Human Resource Development Canada.

Jackson, A. 1998. "The NAIRU and the Macroeconomic Policy in Canada." Ottawa: Canadian Labour Congress, unpublished paper.

Johnston, J. 1972. *Econometric Methods*. 2d ed. New York: McGraw-Hill.

Muysken, J. 1994. *Measurement and Analysis of Job Vacancies: An International Comparison.* Aldershot, UK: Avebury Press.

Nova Knowledge. 1998. Nova Scotia's Knowledge Economy Report Card: 1998, unpublished paper. (http://www.novaknowledge.ns.ca).

Nova Scotia Labour Market Development Secretariat. 1999*a. Toward an Integrated Labour Market Framework: A Consultation with Nova Scotia's Labour Market Partners*, Executive Summary. Halifax: The Secretariat.

_____ 1999*b. Toward an Integrated Labour Market Framework: A Consultation with Nova Scotia's Labour Market Partners*, Main Report. Halifax: The Secretariat.

Osberg, L. 1991. "Unemployment and Inter-industry Labour Mobility in Canada in the 1980s," *Applied Economics* 23(11):1707-18.

_____ 1993. "Fishing in Different Pools – Job Search Strategies and Job-Finding Success in Canada in the Early 1980s," *Journal of Labour Economics* 11(2):348-86.

Osberg, L. and Z. Lin. 1999. "How Much of Canada's Unemployment Is Structural?" paper presented at "The Structural Aspects of Unemployment in Canada" conference organized by the Centre for the Study of Living Standards (CSLS), Ottawa, 22-23 April 1999 and the 1999 Canadian Economics Association (CEA) meetings.

Prasad, E. 1994. "The Canadian Labour Market – Developments, Prospects and Policy," Working Paper No. 94/97. Washington, DC: International Monetary Fund.

Ostry, S. and A. Sunter. 1970. "Definitional and Design Aspects of the Canadian Job Vacancy Survey," *Journal of the American Statistical Association* 65 (September):1059-70.

Reid, F. and N. Meltz. 1979. "Causes of Shifts in the Unemployment-Vacancy Relationship: An Empirical Analysis for Canada," *Review of Economics and Statistics* 61(3):470-75.

Rothschild, K. 1993. *Employment, Wages and Income Distribution: Critical Essays in Economics.* London and New York: Routledge.

Roy, R., H. Henson and C. Lavoie. 1996. "A Primer on Skill Shortages in Canada," Working Paper No. R-96-8E. Ottawa: Applied Research Branch, Human Resources Development Canada.

Sargent, T. and M. Sheikh. 1996. "The Natural Rate of Unemployment: Theory, Evidence and Policy Implications." Ottawa: Economic Studies and Policy Analysis Division, Department of Finance, unpublished paper.

Sharpe, 1999. "The Nature and Causes of Unemployment in Canada," in *Employment Policy Options*, ed. K. Battle and S. Torjman. Ottawa: The Caledon Institute of Social Policy, pp. 3-50.

Statistics Canada. 1978. *Annual Report on Job Vacancies 1978*, Cat. No. 71-203. Ottawa: Supply and Services Canada.

_____ 1987. *Help-Wanted Index 1987*, Cat. No. 71-204. Ottawa: Supply and Services Canada.

_____ 1988. *Help-Wanted Index 1988*, Cat. No. 71-204. Ottawa: Supply and Services Canada.

_____ 1993. *Historical Labour Force Statistics 1993*, Cat. No. 71-201. Ottawa: Supply and Services Canada.

_____ 1998. *The Evolving Workplace: Findings from the Pilot Workplace and Employee Survey*, Cat. No. 71-583. Ottawa: Supply and Services Canada.

_____ *The Canadian Job Vacancy Survey: Technical Appendix*, Cat. No. 71-521. Ottawa: Supply and Services Canada.

Torjman, S. and K. Battle. 1999. *Good Work: Getting It and Keeping It.* Ottawa: Caledon Institute of Social Policy.

Van Rijckeghem, C. 1993. "Endogeneity in Structural Unemployment Equations: The Case of Canada," Working Paper No. 93/94. Washington, DC: International Monetary Fund.