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The Quest for Workers: A New Portrait of Job Vacancies in Canada

The Evolving Workplace Series



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The Evolving Workplace Series

The Quest for Workers: A New Portrait of Job Vacancies in Canada

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FOREWORD

This document provides data from the new Workplace and Employee Survey (WES) conducted by Statistics Canada with the support of Human Resources Development Canada. The survey consists of two components: (1) a workplace survey on the adoption of technologies, organizational change, training and other human resource practices, business strategies, and labour turnover in workplaces; and (2) a survey of employees within these same workplaces covering wages, hours of work, job type, human capital, use of technologies and training. The result is a rich new source of linked information on workplaces and their employees.

Why have a linked workplace and employee survey?

Advanced economies are constantly evolving. There is a general sense that the pace of change has accelerated in recent years, and that we are moving in new directions. This evolution is captured in phrases such as “the knowledge-based economy” or “the learning organization”. Central to these notions is the role of technology, particularly information technology. The implementation of these technologies is thought to have substantial impact on both firms and their workers. Likely related to these technological and environmental changes, many firms have undertaken significant organizational changes and have implemented new human resource practices. Globalization and increasing international competition also contribute to the sense of change.

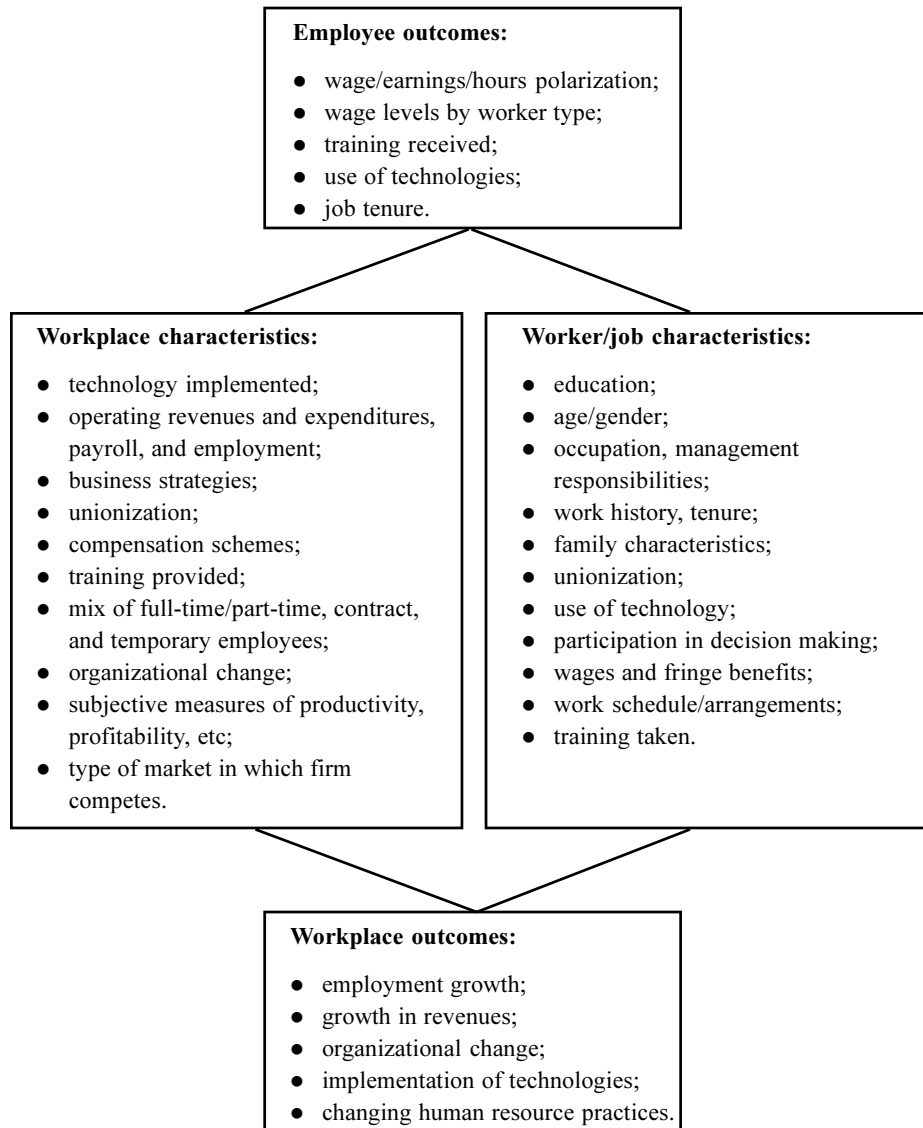
In this environment, greater attention is being paid to the management and development of human resources within firms. Education and training are increasingly seen as an important investment for improved prosperity—both for firms and individual workers.

Thanks to earlier surveys, researchers have a good understanding of workers' outcomes regarding wages and wage inequality, job stability and layoffs, training, job creation, and unemployment. What is missing on the employees' side is the ability to link these changes to events taking place in firms. Such a connection is necessary if we hope to understand the association between labour market changes and pressures stemming from global competition, technological change, and the drive to improve human capital. Thus, one primary goal of WES is to establish a link between events occurring in workplaces and the outcomes for workers. The advantage of a linked survey is depicted in the figure which displays the main content blocks in the two surveys.

The second goal of the survey is to develop a better understanding of what is indeed occurring in companies in an era of substantial change. Just how many companies have implemented new information technologies? On what scale? What kind of training is associated with these events? What type of organizational change is occurring in firms? These are the kinds of issues addressed in the WES.

This report aims to give those interested in human resource practices some useful insights from the initial survey, as well as stimulating their interest in the possibilities provided by these new data.

Link between the workplace survey content, employee survey content, and outcomes



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INTRODUCTION

Although many countries collect statistics describing the labour supply situation, few collect data on the labour demand side. The number of vacant positions and the number of positions filled can provide a picture of the demand for labour. The job vacancy rate—the proportion of unmet demand for labour in relation to the total demand—is an important economic indicator that summarizes companies' hiring intentions and indicates the future direction of labour demand. It reflects the general situation in the labour market by indicating periods of excess labour demand or job shortages, in specific sectors or in the economy as a whole. The new Workplace and Employee Survey (WES), conducted in 1999, allows us to estimate retrospectively the job vacancy rate for the period surveyed.¹

Of the 735.9 thousand establishments in Canada,² a small proportion (13%, or 95.4 thousand) reported a total of 286,415 job vacancies in 1999. The job vacancy rate was 2.6%³—a relatively high figure compared with previous estimates which showed job vacancy rates around 1%.⁴ There are at least two reasons for this difference. First, compared to

¹ See Appendix C for detailed information on the concepts and questions used from the WES to derive all the data related to job vacancies in this document.

² Excluding crop or animal production, fishing, hunting and trapping, private households and public administration.

³ The job vacancy rate is calculated as follows: (number of vacant positions/(number of employees + number of vacant positions)) * 100.

⁴ Osberg and Lin (2000) estimated the rate at 0.60% in 1999, and a survey conducted jointly by Human Resources Canada and the Ministère de la main-d'œuvre du Québec (1995) estimated the job vacancy rate for Quebec at 1.48% as reported in Roy et al. (1996).

the mid-1990s, the year 1999 was characterized by strong annual growth in both total employment (2.8%)⁵ and Gross Domestic Product (4.3%),⁶ and the unemployment rate was relatively low, at 7.6%. As a result, one would expect a relatively large number of job vacancies in 1999 compared with the mid-1990s.⁷ Second, there are important differences in the concept of job vacancy between WES and previous surveys. For example, the Job Vacancy Survey (JVS), conducted by Statistics Canada during the 1970s, estimated job vacancy rates which varied between 0.4% and 1.6% during the 1971-1978 period. In the JVS, only job vacancies to be filled from outside the firm were collected. In contrast, WES includes all vacancies, internal and external.⁸ Consequently, the job vacancy rates reported in this study may overestimate the number of jobs available to unemployed workers since they include some positions available only to people inside the firm. Companies may fill these positions—through promotions or lateral moves—with existing workers and may not replace them through external recruitment.

This report first examines the relationship between the job vacancy rate and the unemployment rate for Canada and its regions. It then explores the job vacancy rate by industry and wages and by establishment size.

⁵ Labour Force Survey, Canada; employment growth from December 1998 to December 1999.

⁶ Gross Domestic Product (GDP), Canada; GDP at market prices (1992 dollars=100).

⁷ This may explain why the vacancy rates in the WES pilot survey of 1996 and in a job vacancy survey conducted in Quebec in 1995 amounted to only 1% and 1.48%, respectively.

⁸ Another reason for the difference could be that some respondents in WES may report job vacancies for jobs available in the future as well as for jobs available immediately. In JVS, job vacancies are restricted to jobs available immediately. However, the empirical importance of this third factor is likely to be small.

Job vacancies usually fill two types of needs within an establishment: replacement of personnel and expansion of the company. Since it is difficult to distinguish between these two types of demand, this report examines the link between the number of job vacancies on the one hand and indicators of replacement demand and expansion demand on the other. The indicators used are the separation rate, the quit rate (or voluntary separation rate), hirings, employee retention indicators (average payroll per employee, fringe benefits, unionization, training, etc.), and changes in employment.

The WES asked employers how many positions had been vacant for at least four months.⁹ This information was used to distinguish labour demand that was unmet for *frictional* reasons (that is, because of the slowness of the adjustment process in the labour market) from demand that was unmet for *structural* reasons (that is, a spatial mismatch or a mismatch between applicants' qualifications and those required for unfilled positions). At least 4 vacant positions in 10 were unfilled for at least four months, and the long-term job vacancy rate was 1.2%. This report focuses on the reasons employers gave for having positions vacant for longer periods, as well as occupations where long-term vacancies most often exist. Finally, the report concentrates on profit-oriented establishments to analyze other aspects of job vacancies in the for-profit sector.

Link between job vacancies and unemployment

A high unemployment rate usually coincides with a low job vacancy rate and conversely, a high job vacancy rate coincides with a low unemployment rate. This relationship between unemployment and job

⁹ The Job Vacancy Survey also tracked long-term vacancies. However, to be included in the long-term vacancy category, the job had to be vacant for 4 weeks versus the 4 months required in WES.

Figure 1
Relationship between unemployment rate and vacancy rate in Canada, 1999

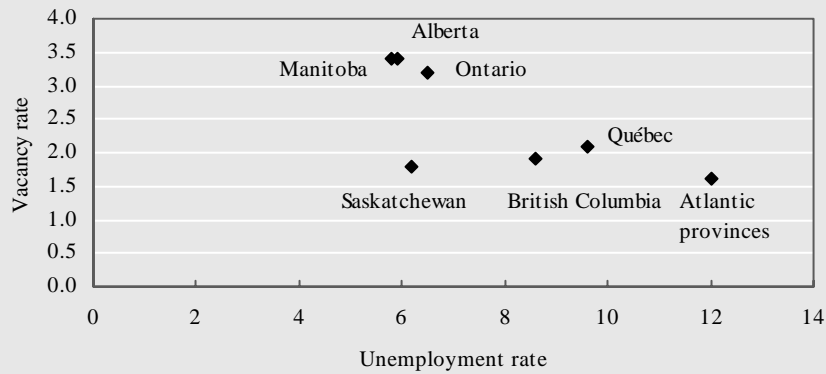
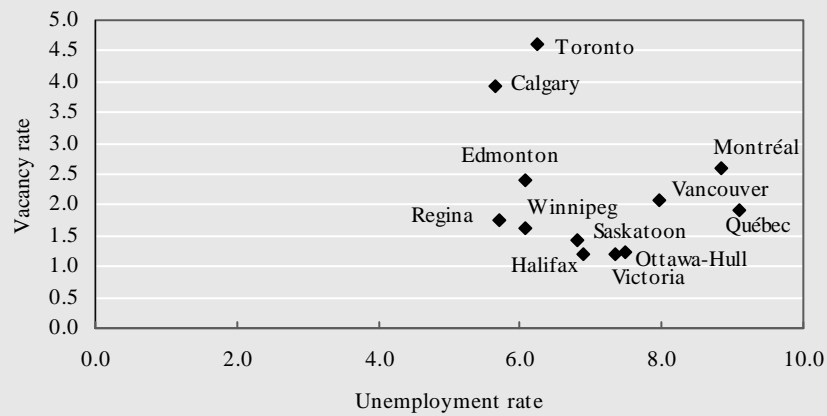


Figure 2
Relationship between vacancy rate and unemployment rate by large Census Metropolitan Area, 1999



vacancies is summarized by the Beveridge curve¹⁰ (also called the “UV” curve), which usually has a negative slope. As the demand for labour rises, the number of unemployed workers tends to decline, while the number of job vacancies tends to increase.

In 1999, the job vacancy rate was 2.6%, while the average unemployment rate (excluding the government sector¹¹) was 7.8%. Alberta, Manitoba and Ontario had the lowest unemployment rates and the highest vacancy rates. Conversely, the Atlantic provinces, British Columbia and Quebec had the largest unemployment rates and the lowest vacancy rates (Figure 1). By Census Metropolitan Areas, Toronto and Calgary showed relatively low unemployment rates and high vacancy rates, while the largest unemployment rates were seen in Québec and Montréal, which had relatively low vacancy rates (Figure 2).

Industry and wages

The lowest vacancy rate was found in the forestry, mining, oil and gas extraction industry (0.9%), which is at the high end of the pay scale (Table 1). Conversely, the highest job vacancy rate was in the retail trade and consumer services industry (3.9%), a relatively low-wage industry.¹²

Overall, 45% of vacant positions have remained unfilled for at least four months. However, four industries show a much higher proportion of

¹⁰ For more details on the Beveridge curve, see, for example, Hansen (1970).

¹¹ The Labour Force Survey data are used to calculate these unemployment rates. The government sector is excluded in these calculations in order to be comparable with the WES concept of all industries.

¹² A definitive statement about causality between wages and vacancy rates cannot be made by simply looking at Table 1. Relatively high wages could lead to low vacancy rates but high vacancy rates could also induce firms to raise their wages.

Table 1
Job vacancy rate by industry

Industry	Job vacancy rate* %	Long-term job vacancy rate 4 months or more (%)	Proportion of vacant positions unfilled for 4 months or more (%)	Average hourly wage rate for full-time employees (\$)
All industries	2.6^E	1.2	45	19.14
Retail trade and consumer services	3.9 ^E	^F	55	13.18
Labour-intensive tertiary manufacturing	2.5	1.4 ^E	56	15.18
Secondary manufacturing	2.2	0.8	35	18.53
Finance and insurance	2.1	0.8	39	19.97
Real estate, rental and leasing operations	^F	^F	75	20.06
Transportation, warehousing and wholesale trade	2.4	0.7	28	20.25
Primary manufacturing	1.2	0.4	36	20.68
Education and health services	1.9	0.7	38	20.77
Business services	2.5	0.7 ^E	28	20.80
Construction	2.3 ^E	1.7	73	21.22
Capital-intensive tertiary manufacturing	2.3	1.0	43	21.92
Information and cultural services	2.1	0.4	19	23.91
Communications and other utilities	2.0	0.8	39	24.28
Forestry, mining, oil and gas extraction	0.9	^F	41	26.42

Source: Workplace and Employee Survey, 1999.

* The vacancy rate is defined as follows: (job vacancies / (total employment + job vacancies)) *100.

long-term job vacancies: construction (73%), real estate, rental and leasing operations (75%), retail trade and consumer services (55%) and labour-intensive tertiary manufacturing (56%).

An estimate was made of the average annual payroll per employee in each establishment (based on total gross payroll). The results were then grouped into three classes: under \$15,600, \$15,600 to \$27,999, and \$28,000

and over (Table 2). In the under \$15,600 segment, more than three-quarters of job vacancies are in retail trade and consumer services, which represents only 58% of employment in this segment.

In the next average payroll segment—\$15,600 to \$27,999—the distribution is less concentrated. In fact, although education and health services accounts for 26% of job vacancies, the vacancies are slightly under-represented since this sector represents 30% of employment in the middle payroll segment; 10% of vacancies are in labour-intensive tertiary manufacturing, while this industry represents only 7% of total employment. In the \$28,000 and over payroll segment, the distribution is again less concentrated: the three largest shares of vacancies are in education and health services, transportation, warehousing and wholesale trade, and business services; this latter industry shows a higher portion of vacancies than total employment (14% versus 12%).

Establishment size

Vacancy rates tend to be lower in larger establishments. In 1999, the job vacancy rate for establishments with 500 or more employees was 1.9%, compared with around 3.0% for establishments with fewer than 100 employees (Table 3).¹³

Smaller establishments account for a sizeable share of labour turnover (Picot, Lin and Pyper, 1997). Compensation (wages and fringe benefits), job security and career opportunities in small establishments are often less favourable than in large establishments (Brown, Hamilton and Medoff, 1990) and this might explain why smaller establishments have more difficulty retaining their employees. The quit rate for establishments

¹³ The difference between the rates by establishment size is significant at 14.2%. For a discussion of the size effect on vacancy rates, see Morissette and Zhang (2001).

Table 2
Distribution of employment and job vacancies by industry and average payroll per employee

	Less than \$15,600		\$15,600 - \$27,999		\$28,000 and over		Total	
	Vacancies	Jobs	Vacancies	Jobs	Vacancies	Jobs	Vacancies	Jobs
Total ('000)	110,964	2,751,267	63,538	3,122,731	111,913	4,903,545	286,415	10,777,543
	%							
Retail trade and consumer services	76.5 ^E	58.1	^F	22.0	4.1 ^E	6.4	36.7 ^E	24.1
Educational and health services	9.0	17.6	25.9	30.3	17.1	18.6	15.9	21.7
Business services	5.8 ^E	9.0	^F	6.0	13.6	11.6	9.1	9.3
Labour intensive tertiary manufacturing	2.7 ^E	4.3	10.0 ^E	7.2	3.1 ^E	3.2	4.5	4.6
Transportation, warehousing and wholesale trade	^F	3.0	^F	7.3	17.1	16.3	9.3	10.3
Primary manufacturing	^F	^F	1.9 ^E	2.8	2.2 ^E	5.9	1.7	3.6
Real estate rental and leasing operations	^F	2.4	1.5	1.6	^F	1.5	^F	1.8
Capital intensive tertiary manufacturing	^F	^F	3.9 ^E	3.2	9.4	9.5	4.8	5.4
Construction	^F	1.0 ^E	4.6 ^E	3.7	5.8 ^E	5.6	3.5 ^E	3.9
Information and cultural services	^F	1.2 ^E	1.6 ^E	2.4	4.7	4.3	2.4	3.0
Forestry, mining, oil and gas extraction	^F	^F	^F	0.9	^F	3.0	0.6 ^E	1.8
Communication and other utilities	0.2 ^E	0.8	1.7	2.4	3.2	3.0	1.7	2.3
Finance and insurance	^F	0.4 ^E	3.1 ^E	6.8	8.2	5.9	3.9	4.8
Secondary manufacturing	^F	^F	4.6 ^E	3.6	4.9	5.2	2.9	3.5

Source: Workplace and Employee Survey, 1999.

Table 3
Job vacancy rate by establishment size

Establishment size	Job vacancy rate*	Long-term job vacancy rate (4 months or more)	Quit rate	Proportion of job vacancies unfilled for 4 months or more
	%			
All establishments	2.6	1.2	12.3	45.4
Fewer than 20 employees	2.9	1.5	15.2	52.9
20-99 employees	3.1	1.5	14.0	49.5
100-499 employees	2.0	0.6	11.5	28.5
500 employees and more	1.9	0.6	5.7	32.7

Source: Workplace and Employee Survey, 1999.

* The vacancy rate is defined as follows: (job vacancies / (total employment + job vacancies)) *100.

is actually higher in small establishments (15.2%) than in very large establishments (5.7%). For these same reasons, it is possible that small establishments attract fewer applicants when a position becomes vacant. This may also be why small establishments have more positions vacant for four months or longer. Almost 53% of all vacant positions in establishments with fewer than 20 employees had been vacant for at least four months, compared with 29% and 33% for establishments in the other two highest size categories.

Why are positions vacant?

The number of vacant positions in an establishment depends on several factors, including the establishment's place in its life cycle (in expansion or in decline), the seasonal nature of its production, its employee retention capacity (e.g., wages, employment conditions, fringe benefits...), the competition for market share among companies in the

same industry and their ability to attract workers, the business cycle and the available supply of labour. Also, some jobs remain unfilled because no applicant with the necessary qualifications is available locally at the wage rate offered. The number of vacant positions may thus be indicative of a labour shortage (at the regional or national level).¹⁴

Vacant positions may be divided into two types: positions left by workers who have quit, retired or been fired (these vacancies reflect replacement demand) and positions vacant because of the expansion of the establishment (these vacancies reflect expansion demand). A given establishment may obviously have job openings to meet both its replacement demand and its expansion demand. Given the sizeable turnover in the Canadian labour market, replacement demand is usually considered to be greater than expansion demand (Picot, Heisz and Nakamura, 2001). Since these two types of demands are difficult to separate, this study looks at the link between job vacancies and indicators that may represent either or both types of demand for labour.

Replacement and expansion demand indicators

We first consider two indicators of replacement demand: separation and quit rates. The separations here include quits (voluntary separations), retirements and firings, and represent the replacement demand; they exclude layoffs and special workforce reductions. Job vacancy rates generally increase with separation rates (Table 4). This simple relationship may reflect a size effect, since small establishments have relatively high vacancy rates and separation rates.

¹⁴ This shortage may be due to a spatial mismatch or a mismatch with respect to occupations or skills.

Since quits represent the majority of separations, it is worth looking at them separately. Overall, the job vacancy rate for establishments with quits is actually nearly two times higher (3.0%) than for establishments without quits (1.6%). The corresponding figures for job vacancies unfilled for at least four months are 1.3% and 0.8% respectively (Table 4). The job vacancy rate also increases as the quit rate rises.

Hiring indicates both replacement and expansion demand. Since hiring can be used as proxy for vacancies, it is not surprising to see that the job vacancy rate is higher for establishments that have carried out hiring over the past fiscal period and it generally increases with the hiring rate. The gap between the vacancy rates—whether or not the establishment had hired new employees during the year—still holds when the size of the establishment increases.

In order to analyze the effect of expansion demand, we looked at employment changes over the previous year, for both total and part-time employment (Table 5). There was no significant change in the rates when total or part-time employment varied.

At least two factors could explain this pattern. First, expanding firms may have other characteristics (such as relatively high wages, good working conditions, etc.) which tend to reduce their labour turnover and, as a result, offset the effect of strong expansion demand through a lower replacement demand. Second, workers in expanding firms could feel more secure about their job and consequently tend to quit less often. This would reduce the need to replace workers in these firms and also offset the effect of strong expansion demand.

Table 4
Job vacancy rate by separation, quit and hiring rates

	Job vacancy rate	Long-term job vacancy rate (4 months or more)
	%	
Overall rate	2.6	1.2
Without separations*	1.6	0.7
With separations	2.8	1.2
Less than 5%	1.3	0.4
5% to 9.9 %	2.2	1.0
10% to 14.9%	2.0	0.6 ^E
15% to 19.9%	4.4	F
20% and over	4.6	F
Without quits	1.6	0.8
With quits	3.0	1.3 ^E
Less than 2%	1.3	0.4
2% to 3.9%	1.5	0.4
4% to 5.9%	1.9	0.9 ^E
6% to 7.9%	2.2	0.7 ^E
8% to 9.9%	2.3	0.9 ^E
10% to 19.9%	3.1	1.4 ^E
20% and over	4.9	F
Without hiring	1.0	0.4
With hiring	2.6	1.1
Less than 20%	2.3	F
20% to 49.9%	3.0	1.1 ^E
50% to 99.9%	3.8	1.5 ^E
More than 100%	4.6 ^E	F

Source: Workplace and Employee Survey, 1999.

* Separations do not include layoffs but include quits, dismissals for cause and retirements.

Other indicators

We also examined other indicators related to the establishment's employee retention capacity. If an establishment offers good salaries, training, fringe benefits and makes an effort to involve its employees in its

Table 5
Job vacancy rates by change in employment

	Job vacancy rate	Long-term job vacancy rate (4 months or more)
	%	
All establishments	2.6	1.2
Change in total employment*		
Shrinkage	2.6	1.5 ^E
No change	2.8	^F
Growth	2.3	0.7
Change in part-time employment*		
Shrinkage	2.3	1.0
No change	2.8	1.5
Growth	2.5	0.9

Source: Workplace and Employee Survey, 1999.

* Differences not statistically significant.

decision-making processes, it might be better able to retain its employees and therefore have fewer quits (voluntary separations).¹⁵

The WES collected information on retention enhancing policies at an establishment, using indicators such as training provided by the employer, implementation of new management methods (employee suggestion program, flexible job design, problem-solving teams, etc.), the current use of computers, the innovative nature of the establishment (through new/improved products, services or production processes) and the introduction of new technology in the past year.

The vacancy rate tended to be higher when establishments had low average payroll per employee, if there were no fringe benefits and if

¹⁵ For a discussion on human resources practices in relation with training and pay schemes reported in the WES, see Leckie et al. (2001).

Table 6
Job vacancy rates by selected indicators

	Job vacancy rate	Long-term job vacancy rate (4 months or more)
		%
All establishments	2.6	1.2
Average payroll per employee¹		
Less than \$20,000	3.4	F
\$20,000 to \$49,999	2.2	0.9
\$50,000 and over	2.0	0.9
Fringe benefits²		
All benefits	2.2	0.8
At least one but not all	2.1	0.8
At least one	2.2	0.8
None	3.7	F
Unionization		
No	3.0	1.5 ^E
Yes	1.8	0.7
Training³		
No	1.4	0.9 ^E
Yes	2.8	1.2
Percent of employees using computers		
Less than 1%	F	F
1% to 24.9%	2.4	1.0
25% and over	2.1	0.7
New management method^{1,4}		
No	2.9	1.7
Yes	2.4	0.8
Innovation		
Yes	3.0	F
No	1.8	0.6

Source: Workplace and Employee Survey, 1999.

¹ Differences are not significantly different from 0.

² Includes pension plans and group RRSPs, life/disability insurance plans, supplemental medical insurance and dental care plans.

³ Includes on-the-job training, classroom training and training funded by the employer.

⁴ Includes employee suggestion program, flexible job design, information sharing with employees problem-solving teams, joint labour-management committees and self-directed work groups. Questions relating to the use of a new management method applied only to establishments with more than 10 employees.

workers were not unionized (Table 6). Establishments that offered training¹⁶ had higher vacancy rates than those that did not. Even when the type of training offered to recent hired personnel was removed—such as new employee orientation and apprenticeship training programs—the difference in the vacancy rates still held. This observation may be due to the fact that firms use training to respond to labour shortages (Baldwin and Peters, 2001). The vacancy rate was also higher if the establishment was innovative. Other indicators did not show statistically significant differences.

These results are probably related to a set of factors that, when taken together, may either cancel each other out or accentuate the impact on job vacancies.¹⁷

Positions vacant for at least four months

Although, for reasons mentioned above, the number of positions unfilled for at least four months may over-estimate the number of job vacancies that exist for structural reasons, it nevertheless provides a ready indicator of vacant positions that employers are finding difficult to fill. In 1999, 45% of vacant positions were of this type, and the longer term job vacancy rate was 1.2%.

Which occupations account for the largest share of unmet longer-term demand, and what are the reasons cited to explain this phenomenon? Of all the major occupational groups, production workers accounted for the largest proportion of job vacancies. This is not surprising since this

¹⁶ Training includes on-the-job training, classroom training and training funded by the employer.

¹⁷ For results from a multivariate analysis of this question, see Morissette and Zhang (2001).

Figure 3
Long-term vacancies by occupation

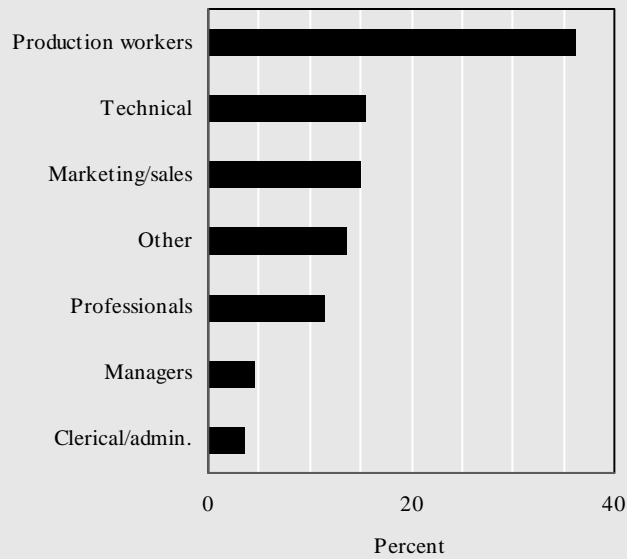
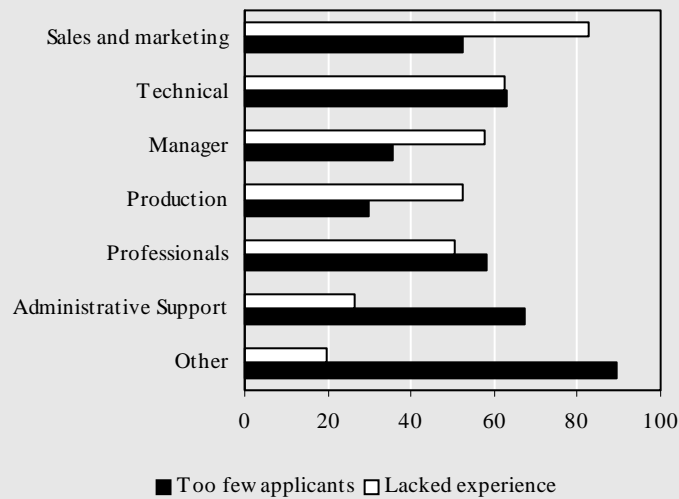


Figure 4
Reasons most often cited for having vacant positions for at least four months, by occupation



category comprises the greatest number of employees. Positions for technical personnel, sales and marketing personnel and professionals rank somewhat behind while positions of managers and clerical and administrative personnel account for only a small share of the whole. Lastly, a relatively high proportion of job vacancies could not be classified within any of the existing categories (Figure 3).

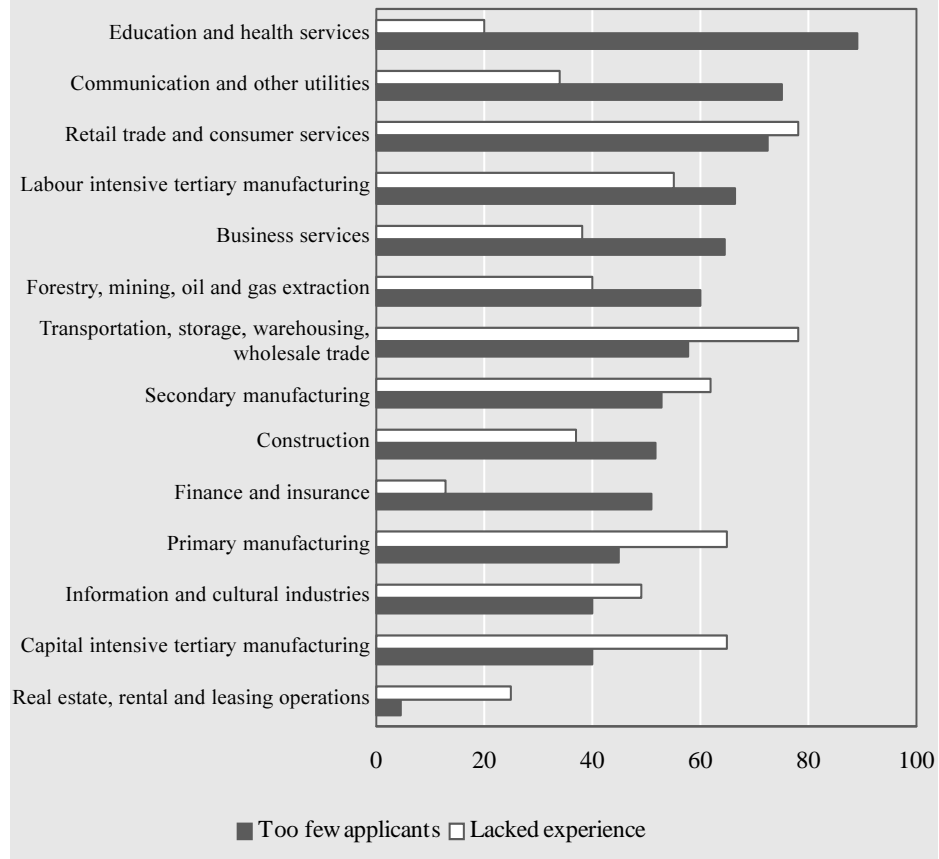
The reasons employers cited most often to explain why these positions were still vacant after four months or longer were the applicants' lack of experience and too few applicants.¹⁸ However, these two reasons varied depending on the occupational group; for example, for managerial positions, sales and marketing positions and production positions, the reason most often cited was applicants' lack of experience, while for professionals, technical personnel and the clerical and administrative group, the reason most often cited was too few applicants¹⁹ (Figure 4). Another reason worth mentioning was lack of education which was reported frequently (46% of the respondents) for having long-term vacancies in technical positions.

Now turning to the distribution of reasons most cited by industry, WES results show that having too few applicants was more critical for education and health care services where more than 80% of the respondents cited this reason for their long-term vacancies (Figure 5). Lacking experience was the most critical reasons cited by employers in transportation, warehousing and wholesale trade as well as for retail trade and consumer services.

¹⁸ These findings must be interpreted with caution, since any of these reasons may conceal poor conditions offered for vacant positions.

¹⁹ To be included in the professional and technical groups, applicants must have a university education.

Figure 5
Reasons most often cited for having positions vacant for four months or longer, by industry



The length of time for which positions remain vacant may increase if a firm faces the problem of mismatches either in workers' qualifications or geographic location. Some industries may require specific skills and high education levels. For other industries, the type of qualifications sought may be dictated by the level of technology and capital use or a combination of technical and management skills.

The choice of recruitment methods can substantially influence the length of time for which positions remain vacant (Roper, 1988 and Beaumont, 1978). In fact, the time tends to decrease as the number of recruitment methods increases. Recruitment methods will also differ according to the type of employee sought. For example, a recent study on hiring, retention and dismissal practices finds that for more than half of respondent employers, the use of "head-hunter" firms is by far the most effective method of filling managerial positions. However, this is not the case when it comes to recruiting other types of employees (Axmith, 2000).

Although the WES did not request details on the different recruitment methods used, respondents were asked to indicate whether they hired primarily from within or outside the company.²⁰ Regardless of the occupation, the majority of employers (74%)²¹ fill their vacant positions from outside the company.

²⁰ The 1999 WES employers were asked if vacant positions are usually filled from within the workplace or from another workplace within the same legal company or business enterprise or from outside the company. The employee categories include managers, professionals, technical/trades, marketing/sales, clerical/administrative, production workers with no trade/certification, other. The WES employee respondents were asked how they learned about the job opening in terms of recruitment method and if they were required to take tests related to skills, aptitude, personality, job-related knowledge, literacy and/or personal interviews.

²¹ This number refers to employers hiring exclusively from outside of the company. In addition, 83% of employers both hire from outside of the company and have other staffing strategies.

Table 7

Job vacancy rates by establishment characteristics for profit-oriented establishments

	Estab- lishments with vacancies	Jobs in estab- lish- ments with vacancies	Vacancy rate for estab- lish- ments with vacancies	Vacancy rate (all estab- lish- ments)
			%	
All profit-oriented establishments	12.8	35.0	7.8	2.7
Part of a multi-establishment firm				
No	12.3	30.7	10.6	3.3
Yes	14.9	42.1	4.4	1.9
Adopting new technology increasing skill requirements				
No	10.7	31.2	8.4	2.6
Yes	25.0	46.0	6.8	3.1
Who deals with human resources matters?				
Human resources unit in establishment	31.7	61.4	3.9	2.4
One person full-time in establishment	F	F	F	F
One person part-time in establishment	11.3	25.6	9.4	2.4
Person/unit outside establishment	10.7	21.6	8.1	1.8
Issues handled as they arise	13.3	26.9	11.0	3.0
Other arrangement	F	F	F	F
Local unemployment rate				
4% to 5.9%	15.1	38.2	8.6	3.3
6% to 7.9%	10.6	30.8	6.5	2.0
8% or above	8.4	29.7	6.5	1.9

Source: Workplace and Employee Survey of 1999.

Job vacancies in profit-oriented establishments

In previous sections, both profit-oriented and non profit-oriented establishments were considered. In this section, attention is restricted to profit-oriented establishments.

Only 13% of all profit-oriented workplaces had vacancies in 1999 (Table 7). The number of jobs (that is, number of positions already filled plus number of job vacancies) in establishments with vacancies represented 35% of all jobs available. Since these establishments had a job vacancy rate of 7.8%, the overall vacancy rate was 2.7% ($35\% * 7.8\%$). This figure is very close to the 2.6% job vacancy rate observed for all establishments—profit- and non profit-oriented—reported in previous sections.

Several interesting patterns emerge from Table 7. Establishments that are not part of a multi-establishment firm tend to have relatively high vacancy rates. The same pattern occurs among establishments that have introduced a new technology which increased skill requirements. As expected, establishments that operate in tight local labour markets—that is, local labour markets with low unemployment rates—face more severe labour constraints than others.²² Contrary to our expectations, establishments that have a separate human resources unit do not have particularly low vacancy rates.

So far, we have examined job vacancy rates looking at one dimension at a time. When we consider three dimensions simultaneously, we find that establishments whose percentage of skilled workers is higher than average (37.6%) and which, during the past year, have implemented

²² Local unemployment rates are defined as the unemployment rates of men aged 25 to 54, by economic region.

an innovation and have introduced a new technology increasing skill requirements show vacancy rates of 3.9%.²³ These establishments account for 6% of all jobs in the private sector. Furthermore, non-unionized establishments operating in retail trade and consumer services industries and not belonging to a multi-establishment firm have even higher vacancy rates (5.3%). These establishments account for fully one-third of all job vacancies.

This last finding suggests that a substantial share of job vacancies originate from retail trade and consumer services industries. Table 8 confirms this. More than 40% of all job vacancies and 50% of long-term vacancies originate from this sector. Thus, even in periods of strong economic growth, a substantial share of job vacancies are outside the high-technology sectors.

²³ Skilled workers are defined as employees who are managers, professionals or technical/trades workers.

Table 8
Job vacancies by industry, profit-oriented establishments

Industry	All vacancies	Long-term job vacancies (4 months or more)
		%
Forestry, mining oil and gas extraction	0.6	0.5
Labour intensive tertiary manufacturing	5.5	6.2
Primary manufacturing	2.1	1.7
Secondary manufacturing	3.6	2.6
Capital intensive tertiary manufacturing	5.4	5.5
Construction	4.0	6.1
Transportation, warehousing and wholesale trade	10.9	6.6
Communication and other utilities	1.4	1.3
Retail trade and consumer services	43.1	50.3
Finance and insurance	4.3	3.6
Real estate, rental and leasing operations	3.3	5.7
Business services	9.8	6.2
Education and health services	3.2	2.8
Information and cultural services	2.8	0.9
Total	100.0	100.0

Source: Workplace and Employee Survey of 1999.

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CONCLUSION

Establishments with high vacancy rates consist of at least two types: those with fairly high skill requirements and those in high turnover, low-paid, non-unionized sectors such as retail trade and consumer services industries.

For some firms, having vacancies may be profit-maximizing. In workplaces where the costs of training—and thus costs of labour turnover—are low, high vacancy rates may result from an optimal strategy which includes paying relatively low wages. There may be a trade-off between paying high wages (thereby reducing vacancies to zero) and having positive vacancy rates.

Even in periods of strong economic growth, a substantial share of job vacancies are outside the high-technology sectors. In 1999, more than 40% of job vacancies and 50% of long-term job vacancies of profit-oriented establishments were in the retail trade and consumer services industries.

These data were drawn from the first year of the WES (1999). The WES longitudinal database, which will come into existence with the introduction of the data for 2000, will shed more light on the persistence of job vacancies and how this phenomenon relates to various factors such as the characteristics, practices and business strategies of establishments. It will also provide answers to questions such as the following:

- What are the characteristics of firms that have managed to meet their human resource objectives?
- Are there industrial sectors that are replacing less skilled workers with more skilled personnel, where, for example, companies lay off blue-collar workers and hire highly-skilled staff?
- What are the characteristics (age, salary, working conditions) of workers who left their previous job, thereby creating job vacancies?

APPENDIX A: CONCEPTS AND METHODS

Objectives

The Workplace and Employee Survey (WES) is designed to explore a broad range of issues relating to employers and their employees. The survey aims to shed light on the relationships among competitiveness, innovation, technology use and human resource management on the employer side and technology use, training, job stability and earnings on the employee side.

The survey is unique in that employers and employees are linked at the micro data level; employees are selected from within sampled workplaces. Thus, information from both the supply and demand sides of the labour market is available to enrich studies on either side of the market.

Sample sizes and response rates

WES was conducted for the first time during the summer (employer survey part) and fall of 1999 (employee survey part). Just over 6,350 workplaces and about 24,600 employees responded to the survey, representing response rates of 94% and 83%, respectively. The employer sample is longitudinal—the sampled locations will be followed over time, with the periodic addition of samples of new locations to maintain a representative cross section. Employees will be followed for two years only, due to the difficulty of integrating new employers into the location sample as workers change companies. As such, fresh samples of employees will be drawn on every second survey occasion (i.e. first, third, fifth). This longitudinal aspect will allow researchers to study both employer and employee outcomes over time in the evolving workplace.

Appendix A–Table 1. Sample sizes and estimated populations

Industry/Workplace size/Region	Workplaces		Employment	
	Number of respondents	Estimated population	Number of respondents	Estimated population
Overall	6,351	735,911	24,597	10,777,543
Industry				
Forestry, mining, oil and gas extraction	313	13,359	1,193	190,453
Labour intensive tertiary manufacturing	406	20,584	1,620	497,409
Primary product manufacturing	318	7,648	1,434	392,872
Secondary product manufacturing	292	11,762	1,191	371,888
Capital intensive tertiary manufacturing	359	17,059	1,469	585,253
Construction	607	54,659	2,095	419,373
Transportation, warehousing, wholesale trade	706	84,820	2,877	1,114,182
Communication and other utilities	413	9,712	1,376	243,601
Retail trade and consumer services	515	249,409	1,864	2,596,439
Finance and insurance	498	34,153	1,893	512,159
Real estate, rental and leasing operations	364	24,429	1,143	189,303
Business services	467	83,245	1,830	1,006,460
Education and health services	751	109,404	3,193	2,340,519
Information and cultural industries	342	15,669	1,419	317,632
Workplace size				
1-19 employees	2,872	640,077	6,154	3,471,168
20-99 employees	1,743	83,412	8,356	3,260,557
100-499 employees	1,249	10,735	6,810	1,960,109
500 employees or more	487	1,687	3,277	2,085,708
Region				
Atlantic	777	63,152	3,003	709,303
Quebec	1,432	153,277	5,745	2,560,682
Ontario	1,626	276,920	6,187	4,352,265
Manitoba	423	27,888	1,641	402,138
Saskatchewan	329	29,333	1,217	322,333
Alberta	839	80,063	3,183	1,076,019
British Columbia	925	105,279	3,621	1,354,803

Source: Workplace and Employee Survey, 1999.

Appendix A–Table 2. Response rates

Category	Employer response rate (%)	Employee response rate (%)
Overall	94.0	83.1
Industry		
Forestry, mining, oil and gas extraction	97.0	87.1
Labour intensive tertiary manufacturing	91.0	81.3
Primary product manufacturing	95.3	85.7
Secondary product manufacturing	94.7	85.7
Capital intensive tertiary manufacturing	94.5	84.4
Construction	94.3	83.8
Transportation, warehousing, wholesale trade	92.6	84.5
Communication and other utilities	98.0	82.9
Retail trade and consumer services	93.3	82.2
Finance and insurance	96.5	87.5
Real estate, rental and leasing operations	97.3	87.8
Business services	94.2	85.7
Education and health services	96.8	86.5
Information and cultural industries	98.1	87.9
Workplace size		
1-19 employees	96.9	85.0
20-99 employees	95.1	86.8
100-499 employees	92.4	85.0
500 employees or more	93.4	81.6
Region		
Atlantic	96.3	88.8
Quebec	92.4	82.5
Ontario	95.6	84.2
Manitoba	96.4	87.7
Saskatchewan	96.7	86.3
Alberta	94.9	85.0
British Columbia	96.2	85.1

Source: Workplace and Employee Survey, 1999.

Target population

The target population for the employer component is defined as all business locations operating in Canada that have paid employees, with the following exceptions:

- a) Employers in Yukon, Northwest Territories and Nunavut
- b) Employers operating in crop production and animal production; fishing, hunting and trapping; private households and public administration.

The target population for the employee component is all employees working in the selected workplaces who receive a Customs Canada and Revenue Agency T-4 Supplementary form. If a person receives a T-4 slip from two different workplaces, then the person will be counted as two employees on the WES frame.

Survey population

The survey population is the collection of all units for which the survey can realistically provide information. The survey population may differ from the target population due to operational difficulties in identifying all the units that belong to the target population.

WES draws its sample from the Business Register (BR) maintained by the Business Register Division of Statistics Canada, and from lists of employees provided by the surveyed employers.

The Business Register is a list of all businesses in Canada, and is updated each month using data from various surveys, profiling of businesses and administrative sources.

Reference period

The reference period for WES is mainly the 12-month period ending March 1999. Some questions in the workplace portion covered the last pay period ending before March 1999.

Sample design

The survey frame is a list of all units that carries contact and classification (e.g., industrial classification) information on the units. This list is used for sample design and selection; ultimately, it provides contact information for the selected units.

i) Workplace survey

The survey frame for the workplace component of WES was created from the information available on the Statistics Canada Business Register.

Prior to sample selection, the business locations on the frame were stratified into relatively homogeneous groups called *strata*, which were then used for sample allocation and selection. The WES frame was stratified by industry (14), region (6), and size (3), which was defined using estimated employment. The size stratum boundaries were typically different for each industry/region combination. The cut-off points defining a particular size stratum were computed using a model-based approach. The sample was selected using Neyman allocation. This process generated 252 strata with 9,144 sampled business locations.

All sampled units were assigned a sampling weight (a raising factor attached to each sampled unit to obtain estimates for the population from a sample). For example, if two units were selected at random and with equal probability out of a population of ten units, then each selected unit

would represent five units in the population, and it would have a sampling weight of five.

The inaugural WES survey collected data from 6,351 out of the 9,144 sampled employers. The remaining employers were a combination of workplaces determined to be either out-of-business, seasonally inactive, holding companies, or out-of-scope. The majority of non-respondents were owner-operators with no paid help and in possession of a payroll deduction account.

ii) Employee survey

The frame for the employee component of WES was based on lists of employees made available to interviewers by the selected workplaces. A maximum of twelve employees was sampled using a probability mechanism. In workplaces with fewer than four employees, all employees were selected.

Data collection

Data collection, data capture, preliminary editing and follow-up of non-respondents were all done in Statistics Canada Regional Offices. Interviewers in person collected the workplace survey data. The workplace questionnaire covered a wide range of topics. For about 20% of the surveyed units (mostly large workplaces), more than one respondent was required to complete the questionnaire. For the employee component, telephone interviews were conducted with persons who had agreed to participate in the survey by filling out and mailing in an employee participation form.

Statistical edit and imputation

Following collection, all data were analyzed extensively. Extreme values were listed for manual inspection in order of priority determined by the size of the deviation from average behaviour and the size of their contribution to the overall estimate.

Respondents who opted not to participate in the survey—*total non-response*—were removed and the weights of the remaining units were adjusted upward to preserve the representativity of the sample. For respondents who did not provide all required fields—*item non-response*—a statistical technique called *imputation* was used to fill in the missing values for both employers and employees. The particular method that was selected for this purpose, *weighted hot-deck*, is based on first identifying respondents at a certain level called *imputation class*, and then from within the imputation class a donor is selected using a probability mechanism. The donor's value is then transferred to the missing field of the non-respondent.

The WES components were treated independently even if some questions on the employee questionnaire could have been imputed from the related workplace questionnaire.

Estimation

The reported (or imputed) values for each workplace and employee in the sample are multiplied by the weight for that workplace or employee; these weighted values are summed up to produce estimates. An initial weight equal to the inverse of the original probability of selection is assigned to each unit. To calculate variance estimates, the initial survey weights are adjusted to force the estimated totals in each industry/region group to agree with the known population totals. These adjusted weights

are then used in forming estimates of means or totals of variables collected by the survey.

Variables for which population totals are known are called auxiliary variables. They are used to calibrate survey estimates to increase their precision. Each business location is calibrated to known population totals at the industry/region level. The auxiliary variable used for WES is total employment obtained from the Survey of Employment, Payrolls and Hours.

Estimates are computed for many domains of interest such as industry and region.

Data quality

Any survey is subject to errors. While considerable effort is made to ensure a high standard throughout all survey operations, the resulting estimates are inevitably subject to a certain degree of error. Errors can arise due to the use of a sample instead of a complete census, from mistakes made by respondents or interviewers during the collection of data, from errors made in keying in the data, from imputation of a consistent but not necessarily correct value, or from other sources.

Sampling errors

The true sampling error is unknown; however, it can be estimated from the sample itself by using a statistical measure called the *standard error*. When the standard error is expressed as a percent of the estimate, it is known as the relative standard error or *coefficient of variation*.

Non-sampling errors

Some non-sampling errors will cancel out over many observations, but systematically occurring errors (i.e. those that do not tend to cancel) will contribute to a bias in the estimates. For example, if respondents consistently tend to underestimate their sales, then the resulting estimate of the total sales will be below the true population total. Such a bias is not reflected in the estimates of standard error. As the sample size increases, the sampling error decreases. However, this is not necessarily true for the non-sampling error.

Coverage errors

Coverage errors arise when the survey frame does not adequately cover the target population. As a result, certain units belonging to the target population are either excluded (under-coverage), or counted more than once (over-coverage). In addition, out-of-scope units may be present on the survey frame (over-coverage).

Response errors

Response errors occur when a respondent provides incorrect information due to misinterpretation of the survey questions or lack of correct information, gives wrong information by mistake, or is reluctant to disclose the correct information. Gross response errors are likely to be caught during editing, but others may simply go through undetected.

Non-response errors

Non-response errors can occur when a respondent does not respond at all (total non-response) or responds only to some questions (partial non-response). These errors can have a serious impact on estimates if the

non-respondents are systematically different from the respondents in survey characteristics and/or the non-response rate is high.

Processing errors

Errors that occur during the processing of data represent another component of the non-sampling error. Processing errors can arise during data capture, coding, editing, imputation, outlier treatment and other types of data handling. A coding error occurs when a field is coded erroneously because of misinterpretation of coding procedures or bad judgement. A data capture error occurs when data are misinterpreted or keyed in incorrectly.

Joint interpretation of measures of error

The measure of non-response error and the coefficient of variation must be considered jointly to assess the quality of the estimates. The lower the coefficient of variation and the higher the response fraction, the better will be the published estimate.

Confidentiality

The information presented in this publication has been reviewed to ensure that the confidentiality of individual responses is respected. Any estimate that could reveal the identity of a specific respondent is declared confidential, and consequently not published.

Response/non-response

- a) **Response rate:** includes all units, which responded by providing “usable information” during the collection phase.
- b) **Refusal rate:** includes those units, which were contacted but refused to participate in the survey.

APPENDIX B: INDUSTRY DEFINITIONS

WES industry codes	Industry descriptions	3-digit North American industry classification system (NAICS)
01	Forestry, mining, oil and gas extraction	113, 115, 211, 212, 213
02	Labour intensive tertiary manufacturing	311, 312, 313, 314, 315, 316, 337, 339
03	Primary product manufacturing	321, 322, 324, 327, 331
04	Secondary product manufacturing	325, 326, 332
05	Capital intensive tertiary manufacturing	323, 333, 334, 335, 336
06	Construction	231, 232
07	Transportation, storage, warehousing, wholesale trade	411, 412, 413, 414, 415, 416, 417, 418, 419, 481, 482, 483, 484, 485, 486, 487, 488, 493
08	Communication and other utilities	221, 491, 492, 562
09	Retail trade and consumer services	441, 442, 443, 444, 445, 446, 447, 448, 451, 452, 453, 454, 713, 721, 722, 811, 812
10	Finance and insurance	521, 522, 523, 524, 526
11	Real estate, rental and leasing operations	531, 532
12	Business services	533, 541, 551, 561
13	Education and health services	611, 621, 622, 623, 624, 813
14	Information and cultural industries	511, 512, 513, 514, 711, 712
Industrial activities excluded from WES		3-digit North American industry classification system (NAICS)
Crop production/animal production		111, 112
Fishing, hunting and trapping		114
Private households		814
Federal government public administration		911
Provincial and territorial public administration		912
Local, municipal and regional public administration		913
Aboriginal public administration		914
International and other extra-territorial public administration		919

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APPENDIX C: MEASURES OF JOB VACANCIES

The number of job vacancies is usually measured in three ways: by surveys, by job postings in employment centres and by newspaper ads. Some studies use the number of new hirings, since these may be considered as job vacancies that have just been filled.

Methods based on job postings in employment centres and newspaper ads are not exhaustive, since some job vacancies will not be advertised if the firm believes it can fill them easily. Therefore, job postings in employment centres will often be for positions that are more difficult to fill. Positions advertised in newspapers may appear more than once in different papers, and therefore the same job vacancy will be counted more than once. Also, with the advent of the Internet, the number of openings posted in newspapers represents no more than a portion of all job vacancies. The Statistics Canada help wanted index provides the number of ads of vacant jobs in large metropolitan area newspapers since 1962.

Although surveys of job vacancies seem one of the most reliable methods to collect information on vacancies, there is some question as to what constitutes a job vacancy and how individual respondent firms interpret this concept. For example, in small firms with no formal description of their positions, the concept of job vacancy will probably be more ambiguous than in larger firms with many employees; these larger firms tend to have job descriptions as well as a specific unit responsible for human resources. A firm may post job vacancies even though they are filled at the time they are posted. This may occur, for example, where the

firm knows that an employee will be leaving shortly (because he or she will be retiring or has found a better job elsewhere or because the employee is filling the position in an acting capacity, etc.). Some studies define vacant positions in the same spirit as unemployed workers are defined, namely as positions available immediately for which employers wish to allocate resources in order to fill them. Statistics Canada conducted the Job Vacancy Survey (JVS) from 1971 to 1978 and adopted a concept similar to unemployment. In the context of that survey, job vacancies had to meet the following conditions:

- 1) jobs must be available immediately
- 2) jobs must be vacant for the entire survey day
- 3) jobs must be available to persons outside the firm
- 4) must be jobs which employers tried to fill within four weeks prior to survey day.

In the Workplace Employee Survey, job vacancies were reported through three questions and the reference period was the time of the survey.

Questions:

- 3a) How are vacant positions usually staffed? For all applicable categories¹, check only the most frequently used method.

¹ The applicable categories are : a) managers, b) professionals, c) technical/trades, d) marketing/sales, e) clerical/administrative, f) production workers with no trade/certification, g) other.

- From within the workplace
- From another workplace within the same legal company or business enterprise
- From outside the company

3b) At this location (establishment), are there any vacant positions that you are currently trying to fill?

Yes/no

3c) In total, how many vacant positions are currently unfilled at this location (establishment)?

It is important to emphasize that the job vacancy rates reported in this study may overestimate the number of jobs available to unemployed workers since the rates include some positions available only to people inside the firm [Question 3(a)]. Companies may fill these positions—through promotions or lateral moves—with existing workers and may not replace them through external recruitment.

A last question was also added to distinguish between long-term vacancies (four months or more) and other vacancies. These long-term vacancies had to be distributed among seven occupational groups:

3d) Of those (vacancies), how many positions have remained vacant for four months or longer in the following categories?

- A. Managers
- B. Professionals
- C. Technical/Trades
- D. Marketing/Sales

- E. Clerical/Administrative
- F. Production workers with no trade/certification
- G. Other

For each group with vacant positions for four months or longer, identify the reasons for the vacancies:

- i. Too few applicants
- ii. Most applicants lacked educational requirements
- iii. Most applicants lacked job experience
- iv. Most applicants declined job offer

The WES basic sample size for all locations (establishments) was 6,351 and the selection of profit-oriented locations (establishments) reduced it to 5,398.

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The Workplace and Employee Survey

The **Workplace and Employee Survey (WES)** is a unique survey dealing with workplace and employee issues such as competitiveness, innovation, adoption of technology, organizational change, training and other human resource practices, business strategies and labour turnover in workplaces. For employees within these same workplaces WES is focused on wages, hours of work, work arrangements, use of technologies and training. WES is the first survey to combine detailed information on employers and their employees. Furthermore, the survey tracks respondents over several years in order to provide an understanding of the evolution of Canadian workplaces.

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