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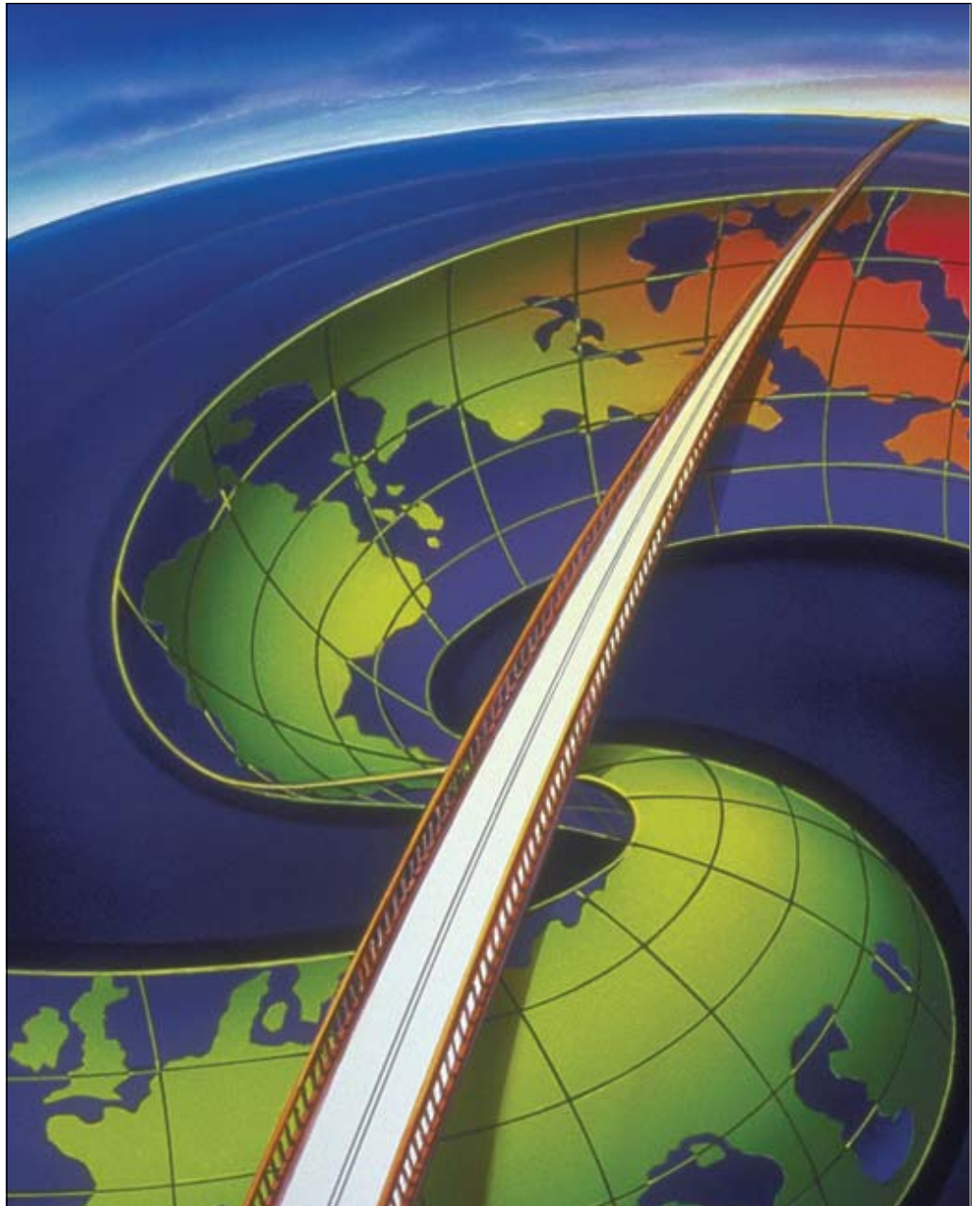
ON LABOUR AND INCOME

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■ DURATION OF MULTIPLE
JOBHOLDING

■ HIGH-TECH BOOM
AND BUST



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.	not available for any reference period
.	not available for a specific reference period
...	not applicable
p	preliminary
r	revised
x	confidential
E	use with caution
F	too unreliable to be published

Highlights

In this issue

■ Duration of multiple jobholding

- Between 1993 and 1999, approximately 1 in 10 employed persons held two or more jobs at the same time (for a period of at least 15 days) at least once during the course of a year.
- Of the 1.3 million multiple jobholders in 1996, 40% ended this work arrangement within 6 months, 17% between 7 and 12 months, 32% between 13 and 48 months, while 12% continued past four years. The median duration of ended multiple jobholding spells was 8 months.
- Short- (6 months or less) and long-term (three years or more) multiple jobholders differed considerably. Long-term were older (40 versus 27), more likely to be married (75% versus 46%), more likely to be self-employed in at least one of their jobs (62% versus 23%), and less likely to be attending school.
- Although long-term multiple jobholders had the highest annual earnings of all other groups (including single jobholders), they also had the longest work schedule—48 hours per week compared with 38 hours for single jobholders, and 31 hours for short-term multiple jobholders. On an hourly basis, average earnings were highest for single jobholders (\$13.10), second highest for long-term multiple jobholders (\$11.45), and lowest for short-term multiple jobholders (\$7.20).

■ High-tech boom and bust

- Following very strong growth of 49% between 1996 and 2000, computer and telecommunications (CT) employment tumbled from its peak in March 2001. By the last quarter of the year, 608,000

people were employed in CT, down 5% from a year earlier. Had it not been for a large drop in CT manufacturing employment (-23%), CT employment would have managed to show a small increase over 2001.

- While CT employment fell 35,000 in 2001, the non-CT sectors of the economy registered a net gain of 101,000 jobs from the last quarter of 2000 to the same quarter a year later. Thus, even though the CT sector accounted for only a small proportion of total employment (4%), it wiped out over a third of the net gains registered by other sectors of the economy.
- The high-tech layoffs and hiring freezes hit some communities more than others in 2001. Of the four centres with the most CT employment (Toronto, Montréal, Ottawa-Gatineau and Vancouver), Ottawa-Gatineau was the most affected—down 15% in the fourth quarter from a year earlier, much more than Toronto (-9%), Vancouver (-6%), or Montréal (-1%).
- Women were most affected by the high-tech woes in 2001. For them, the decline in CT employment (-20,000) was much greater than that for men (-14,000), even though almost two-thirds of all CT workers were men.
- During the 1997 to 2000 period, employers raced to hire highly qualified CT professionals, doubling the number of university-educated workers. While the highly educated reaped the benefits of the high-tech boom, they also suffered more than those with less formal education during the bust of 2001.

Perspectives

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Duration of multiple jobholding

Katherine Marshall

MULTIPLE JOBHOLDERS are a relatively small but important element of the labour market. Knowing the number of secondary jobs held by workers is necessary to calculate the total number of jobs in the economy. Using cross-sectional data, various aspects of multiple jobholding or 'moonlighting' have been previously studied in *Perspectives* (Sussman, 1998; Pold, 1995; Cohen, 1994; Webber, 1989).

With the relatively recent availability of longitudinal data, another facet of multiple jobholding can now be examined—the length of time people work at more than one job. This information can give insight into the stability and dynamics of multiple jobholding. Do people work at more than one job for years or only briefly? If multiple jobholding is generally a stable long-term activity, then the incidence rate, as well as the work schedule and income of multiple jobholders, would remain relatively constant. Conversely, if multiple jobholding is mainly a short-term activity, then the turnover rate of secondary jobs would be high, and the yearly incidence rate of multiple jobholding in the population would also be higher.

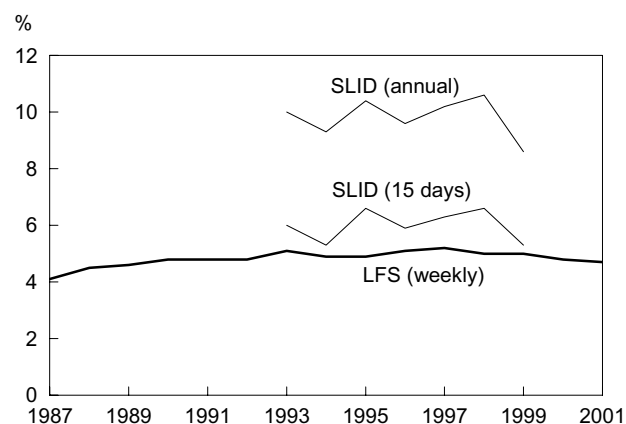
This article looks at the duration of multiple jobholding and the characteristics of short-, medium-, and long-term multiple jobholders, beginning with a look at monthly and annual incidence rates of multiple jobholding over time (see *Data sources and definitions*).

One in 10 workers hold multiple jobs each year

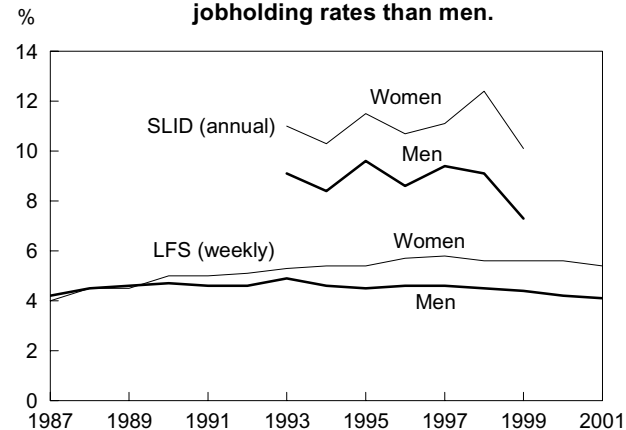
During the Labour Force Survey (LFS) reference period,¹ roughly 5% of workers held more than one job in 2001, a rate that did not change much over 15 years (Chart A).

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Chart A: The one-year multiple jobholding rate* was double that of one week ...



... but either way women had higher multiple jobholding rates than men.



Sources: Labour Force Survey; Survey of Labour and Income Dynamics

* Percent of employed who multiple jobheld sometime during the reference period.

Duration of multiple jobholding

However, since the LFS sample changes each month, it is not possible to determine if multiple jobholders are the same people from month to month.

On the other hand, the Survey of Labour and Income Dynamics (SLID) collects monthly labour market information from the same respondents for six years (longitudinal data), thereby allowing labour market activity changes for individuals to be examined. Therefore, SLID permits the calculation of not only a monthly, but also an annual multiple jobholding rate—that is, the incidence of having at least one multiple jobholding experience over the course of a year. With SLID, persons are considered to be multiple jobholders in any month that they held more than one job concurrently; the spell must have lasted at least 15 consecutive days, and only part of the total period need fall in that month. (Slight differences in multiple jobholding definitions between SLID and LFS may account for some of the monthly rate variation—6% versus 5%, respectively.²) When the SLID reference period is extended to one year, approximately 10% of those employed experienced multiple jobholding for at least 15 days or

more, at least once during a year between 1993 and 1999 (see *Data sources and definitions*).

Both multiple jobholding rates show that women are more likely to be multiple jobholders than men. For example, annual average 1999 LFS data show that 4.4% of employed men held down more than one job, compared with 5.6% of women. In the same year, SLID estimated that 7.3% of men experienced at least one episode of multiple jobholding, compared with 10.1% of women. However, women also have much higher involuntary and voluntary part-time employment rates³ than men (Marshall, 2001); this difference is likely linked to their higher multiple jobholding rates. For involuntary part-time workers, a second job helps increase total work hours, whereas for voluntary part-time workers, two part-time jobs may offer a more flexible work arrangement than one full-time job.

On average, multiple jobholding lasts eight months

Since in any given month approximately 6% of the employed are multiple jobholders compared with 10% over the course of a year,

workers must be moving into and out of this work arrangement. SLID data for 1996 show that multiple jobholding peaked in July and August (6.4%) and dropped to 6.1% in September (Table 1). The 40,000 net drop between August and September resulted from 91,000 workers beginning this work arrangement in September and 131,000 stopping after August. The multiple jobholding exit and entry population in the two months accounted for 1.5% of employment. The surge in multiple jobholders in the summer months is likely a reflection of the annual employment increase during this time (increasing the opportunity to multiple jobhold), as well as an increased student population looking for short-term employment.

The considerable month-to-month turnover indicates that multiple jobholding is not a long-term activity for many. In fact, the median duration of the first spell for all multiple jobholders in 1996 was eight months (Table 2). Furthermore, almost 6 in 10 held multiple jobs for a year or less—40% for 1 to 6 months, and 17% for 7 to 12 months. Another 15% ended somewhere between 13 months and two years. The rate

Table 1: Multiple jobholding in 1996

	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
	'000											
Multiple jobholders												
A New in the month	...	41	47	53	99	92	93	55	91	58	43	50
B Last month, but not this month	...	-25	-22	-44	-36	-36	-75	-50	-131	-66	-54	-54
C From previous month	...	782	798	822	830	893	949	967	972	932	924	913
D Total in the month	782	798	822	830	893	949	967	972	932	924	913	910
	%											
Multiple jobholding Rate: D /employed	...	5.2	5.4	5.5	5.9	6.2	6.4	6.4	6.1	6.1	6.0	6.0
Changed MJH status in month: (A + B)/employed	...	0.4	0.5	0.6	0.9	0.8	1.1	0.7	1.5	0.8	0.6	0.7

Source: Survey of Labour and Income Dynamics

Chart B: Six in ten 1996 multiple jobholders ended their first spell within a year.



Source: Survey of Labour and Income Dynamics

fell off considerably after two years (Chart B). Nevertheless, 1 in 10 multiple jobholders in 1996 had worked at more than one job for more than four years—making this work arrangement a way of life.

Longitudinal data can also provide information about subsequent multiple jobholding—an activity which turns out to be quite prevalent. Of the 1.1 million (88%) multiple jobholders in 1996 who stopped within the four-year period, almost one-third (31%) resumed at least once before 1999 (Table 2). The median length of time before starting a second spell was nine months.

Multiple jobholders tend to be younger and better educated

A number of demographic and other differences are evident between those with one job and those with two or more. However, some striking differences exist within the multiple jobholding community as well—particularly between those who juggle multiple jobs for six months or less (short-term), and those who do so for three years or more (long-term).

In 1996, the median age among single job workers was 38, compared with 33 among multiple jobholders (Table 3). However, when all multiple jobholders were followed over the next four years, those who turned out to be short-term multiple jobholders had the youngest median age (27), and long-term the oldest (40).

The large age difference between the two groups suggests different reasons for pursuing the activity. Unpublished data from the 1995 Survey of Work Arrangements and similar 1997 U.S. data confirm this supposition. Younger workers (under 35) were the most likely to state either household expenses or debts as the main reason for holding more than one job, whereas older workers (45 and over) were most likely to answer that they enjoyed the work on the second job (Martel, 2000). Money problems, such as debt, suggest a temporary situation that might be resolved with a second job. Enjoyment of the work arrangement, on the other hand, is likely a key influence in extending the duration of the activity.

Being older, long-term multiple jobholders also tended to be more settled—75% were married and 54% had dependent children at home. Only 46% of short-term multiple jobholders and 67% of single jobholders were married.

Table 2: Duration of first multiple jobholding spell

	Multiple jobholders in 1996	%	Started a second spell	%
Total	1,289,220	100	352,890	31*
6 months or less	512,210	40	181,800	35
7 to 12 months	217,010	17	73,300	34
13 to 24 months	191,880	15	77,770	41
25 to 48 months	214,340	17	F	F
49 months or more	153,780	12	0	...
Median length of completed spell	8 months			

Source: Survey of Labour and Income Dynamics
 * The denominator consists of completed spells only (excludes 49 months or more group).

Table 3: Personal characteristics of multiple jobholders, 1996

	Total employed	Single job	Months of multiple jobholding			
			Total	6 or less	7 to 35	36 or more
			'000			
Both sexes	14,051	12,762	1,289	512	479	298
			%			
Men	54	55	50	51	45	58
Women	46	45	50	49	55	42
			Years			
Median age	38	38	33	27	34	40
			%			
Marital status						
Married or common-law	66	67	58	46	60	75
Not married	34	33	42	54	40	25
Children at home						
Children under 16	42	43	41	32	43	54
No children under 16	58	57	59	68	57	46
Education						
High school or less*	52	53	46	55	41	36
Postsecondary certificate, diploma or degree	48	47	54	45	58	64
Student status						
Part- or full-time	18	17	26	40	23	F
Not a student	82	83	74	60	77	94
Region						
Atlantic	100	92	8			
			100	50	31	19
Quebec	100	94	6			
			100	48	35	17
Ontario	100	92	8			
			100	39	39	22
Manitoba and Saskatchewan	100	85	15			
			100	38	35	27
Alberta	100	85	15			
			100	36	39	25
British Columbia	100	88	12			
			100	35	38	27

Source: Survey of Labour and Income Dynamics

* May include some postsecondary education that was not completed.

On average, a higher proportion of multiple jobholders (54%) had a post-secondary certificate, diploma or university degree compared with non-multiple jobholders (47%). However, considerable differences were again seen by type of multiple jobholder. Some 45% of short-term multiple jobholders had

completed some form of post-secondary schooling compared with 64% of long-term ones. The higher education levels among long-term multiple jobholders may in part reflect their higher average age—being older they have had more chance to complete all their schooling. Indeed, some 40% of

short-term multiple jobholders were attending school in 1996, either part or full time, compared with a very low percentage of long-term ones. However, long-term multiple jobholders were also more likely to work in jobs normally requiring postsecondary schooling (Table 4).

Finally, multiple jobholding rates and durations also varied by province. High rates occurred in Manitoba, Saskatchewan, and Alberta, where 15% of the employed held two or more jobs at least once in 1996. The high rate is not unexpected given that these three provinces have proportionally high levels of employment in agriculture, the occupational group with the highest multiple jobholding rate.

About half of multiple jobholders in the Atlantic region and Quebec were short-term, compared with 39% or less in the other areas. The exceptionally high short-term rate in the Atlantic region (50%) may be linked to the higher-than-average employment levels in the top three seasonal industries: fishing and trapping, logging and forestry, and construction.

One-third of short-term multiple jobholders work in sales and service

Overall, the type of main job held by single and multiple jobholders was relatively similar.

However, a slightly different story emerges when the occupations of main and second jobs held by short-, medium- and long-term multiple jobholders are examined.

Those who started and stopped multiple jobholding after a short time (6 months or less) were much more likely to have a sales and service main or second job (34% and

Data sources and definitions

The **Survey of Labour and Income Dynamics (SLID)** is a longitudinal household survey that began in January 1993. Every three years some 15,000 households are added and surveyed annually for six years, completing two detailed questionnaires each year—one on labour market activity and another on income. This article focused on people who entered the survey in 1996 (Panel 2) and responded consecutively for the next four years (1996 to 1999). Although six years of information are also available for the 1993 Panel 1 respondents, some pertinent secondary job information, essential for this study, was missing. Respondents who were employed when they entered SLID in 1993 were asked the start dates of their main job only, whereas respondents entering in 1996 were asked the start date of all jobs currently held. The start date of all jobs was required in order to calculate the duration of a multiple jobholding spell.

The **Labour Force Survey (LFS)** is a monthly household survey that collects information on labour market activity from all persons 15 and over, and includes a question on whether a person had more than one job during the reference week.

The 1995 **Survey of Work Arrangements**, a supplement to the November 1995 LFS, asked, among other things, why multiple jobholders had chosen to work at more than one job.

For SLID, the **multiple jobholder rate** is based on the number of persons holding more than one job in a given month. The total spell of multiple jobholding must last at

least 15 days, and only part of the total period need fall in that month. For the LFS, the rate is based on the number of persons who were multiple jobholders at any time during the survey reference week. The monthly average for multiple jobholding for both SLID and LFS is the 12-month average from January to December.

The **annual multiple jobholding rate** can be calculated with SLID data only. It refers to the number of persons who were multiple jobholders for at least 15 consecutive days during the year, divided by the number of persons who were employed some time during the year.

The **duration of multiple jobholding** is the length of the first multiple jobholding spell identified for all multiple jobholders in 1996. Most of the 1996 multiple jobholding population (56%) started this work arrangement sometime in 1996, and the duration of their multiple jobholding spell ran from the 1996 month in which they started to the month and year they stopped or the end of the study period (December, 1999), whichever came first. The remaining 44% of the multiple jobholders entered SLID already carrying two or more jobs, and therefore the duration of their multiple jobholding spell ran from the month and year they began multiple jobholding (sometime prior to 1996), to the month and year they stopped, or the end of the study period.

For **short-term multiple jobholders** the spell lasted six consecutive months or less. For **medium-term**, the duration was 7 to 35 months; and for **long-term**, 36 months or more.

40% respectively) than were other multiple jobholders, especially long-term ones (Table 4). In fact, only 18% of long-term multiple jobholders had a main job and 29% had a second job in sales and service. Since over one-third of all sales and service jobs are part-time, this field of work is often a source of second jobs. On the other hand, because these jobs offer relatively low average earnings, many in this line of work (full- or part-time) may be driven to take on another job to meet short-term financial needs. Other studies have also found high multiple jobholding rates among occupations with flexible schedules and high rates of part-time (Sussman, 1998; Amirault, 1997).

Conversely, long-term multiple jobholders were more likely to have a main or second job in management, business, or finance and administration (29% and 22%, respectively) than were short-term (20% and 16%). Another noteworthy difference was in farming. Of long-term multiple jobholders, 7% had a main job and 14% had a second job in agriculture, compared with only 4% and 6% of all multiple jobholders.

Indeed, long-term multiple jobholders were more likely to be engaged in either higher-level, better-paying jobs (often found in business or management) or in self-employed jobs such as farming. A full 62% of long-term multiple

jobholders were business owners (in either their main or second job), compared with only 23% of short-term and 41% of medium-term multiple jobholders. Obviously, if the goal is to take on a second job for a limited period of time, self-employment is not the answer.

Long-term multiple jobholders earn more, work more

Hours of work and earnings also differ within the multiple jobholding population. Short-term multiple jobholders put in fewer hours at their main job (20) than did medium- (30) or long-term (38) (Table 4). Long-term multiple jobholders had the same median hours in their main job as did

Table 4: Job characteristics of multiple jobholders, 1996

	Total employed	Single job	Months of multiple jobholding			
			Total	6 or less	7 to 35	36 or more
			%			
Occupation (main job)						
Management, business, finance and administration	27	27	24	20	27	29
Natural and applied science, health	9	9	11	8	14	13
Social science, art, culture, recreation	9	9	12	10	12	14
Sales and service	26	26	29	34	30	18
Agriculture	3	3	4	F	F	7 ^E
Trade, transport, processing and other	25	26	20	26	14	19
Second* job						
Management, business, finance and administration			19	16	20	22
Natural and applied science, health			9	7	10	10
Social science, art, culture, recreation			14	11	16	15
Sales and service			36	40	36	29
Agriculture			6	F	F	14
Trade, transport, processing and other			17	24	15	9
Class of worker (main/second* job)						
Both (or only) paid	83	85	61	77	59	38
Paid/self-employed			21	10	22	40
Self-employed/paid			11	10	13	11
Both (or only) self-employed	17	15	6	F	6	11
Work status (main job)						
Full-time	80	81	68	66	65	77
Part-time	20	19	32	34	35	23
			\$			
Median yearly earnings (all jobs)	20,960	21,720	14,330	9,770	15,840	29,040
Median weekly hours						
			Hours			
Main job	38	38	30	20	30	38
All jobs	38	38	40	31	41	48

Source: Survey of Labour and Income Dynamics

* For multiple jobholders, this refers to the job with the most hours after the main job.

single jobholders, mainly because both groups were likely to be working full time (77% and 81%, respectively). Only two-thirds of short- and medium-term multiple jobholders worked full time at their main job. The second job for all multiple jobholders added roughly

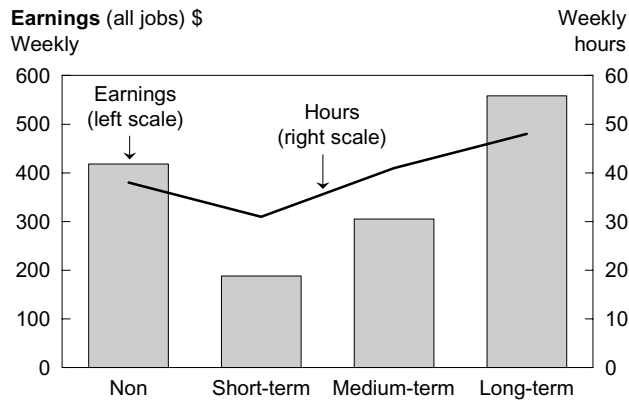
10 hours to their workweek, giving long-term multiple jobholders the longest work schedule at 48 hours per week.⁴ This extra long workweek reinforces the notion that many long-term multiple jobholders participate in the arrangement because they enjoy the work.

Similar to hours, annual 1996 earnings increased with the length of multiple jobholding—\$9,770 for short-term, \$15,840 for medium-term, and \$29,040 for long-term multiple jobholders. Median earnings for single jobholders were between those of medium and long-term multiple jobholders at \$21,720. Although long-term multiple jobholders earned over \$7,000 more per year than any other group, it is important to keep in mind their long workweeks. When earnings are divided by hours, long-term multiple jobholders had only the second highest hourly earnings rate (\$11.45) (Chart C). Although single jobholders earned less annually than did long-term multiple jobholders, they also worked considerably fewer hours per week. They therefore had the highest average hourly earnings (\$13.10). Short-term multiple jobholding is by far the least lucrative work arrangement, with an average hourly rate of only \$7.20. It is not surprising to find that such a poorly paid work arrangement ends early, as most in this situation are probably looking for a better-paying single (or second) job.

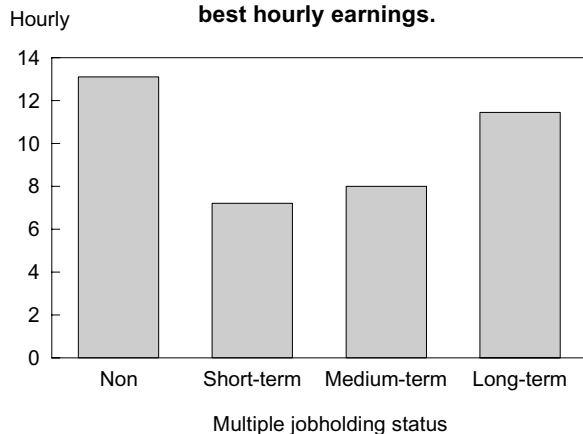
Summary

The SLID longitudinal data reveal a dynamic alternative work arrangement, embarked on for varying lengths of time and for various reasons.

Over the 1996-to-1999 study period, 10% of the employed had at least one episode of multiple jobholding during the course of a year. Multiple jobholding tended to be relatively short-term. Of the 1.3 million multiple jobholders in 1996, 88% had stopped by the end of 1999, and the median duration of

Chart C: Long-term multiple jobholders had the highest weekly earnings and hours*...

... but single jobholders managed the best hourly earnings.



Source: Survey of Labour and Income Dynamics
* Refers to respondent's situation in 1996.

these ended episodes was eight months. But, almost one-third of those who stopped multiple jobholding resumed within the study period.

For a small segment of the multiple jobholding population, this arrangement had become part of their life-style. One in 10 multiple jobholders in 1996 were carrying more than one job for at least four years.

Long-term (three years or more) multiple jobholders differed considerably from those who held multiple jobs for a shorter duration. For example, 62% of long-term multiple jobholders were self-employed in their primary or secondary job, compared with only 23% of those who

held a second job for six months or less. Furthermore, on average, long-term multiple jobholders were more likely to be older, married, working longer hours, and earning higher hourly wages than other multiple jobholders.

Perspectives

Notes

- 1 Data collection for the LFS is carried out each month during the week following the LFS reference week (normally the week containing the 15th day of the month).
- 2 Some variation in multiple jobholding rates between SLID and the LFS may also be due to the difference in sample sizes—15,000 versus 60,000 households, respectively.
- 3 Involuntary or voluntary part-time workers expressed as a proportion of total employment.
- 4 Further analysis of the long-term multiple jobholding population showed that almost one in five had a main or second job in agriculture. It is well known that farmers average long workdays. However, even when farmers are excluded from the median hours calculation, long-term multiple jobholders still averaged 48 hours per week.

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High-tech boom and bust

Geoff Bowlby and Stéphanie Langlois

OVER THE LAST FEW years, the information and communication technology (ICT) sector has become increasingly important. In early 1997, the sector contributed \$33.8 billion to the domestic economy, but by December 2000 this amount had increased a whopping 84% to a peak of \$62.3 billion. The rate of growth during these four years was much greater than that of the economy as a whole (Chart A). As a result, by the end of 2000, the ICT sector made up 7% of all economic

activity in the country, up sharply from 4% four years earlier.

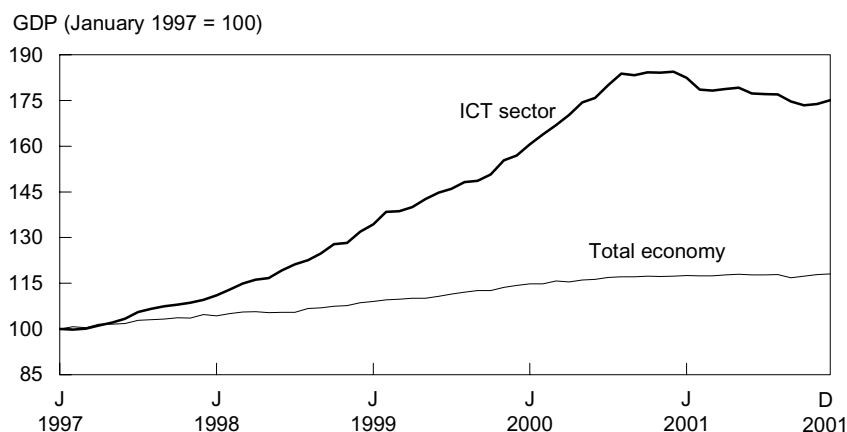
However, the value of the ICT sector plummeted over most of 2001, entirely on the manufacturing side. (ICT services continued to rise in 2001, albeit at a reduced pace from the previous year.) By October, ICT gross domestic product was at \$58.0 billion, a drop of 7%. In the last two months of the year, this figure edged up, ending the year at \$58.8 billion, still down 6% for the year (Chart B).

With less demand for their products, a number of large corporations in the ICT sector announced massive layoffs in 2001 and halted the hiring of new staff. As a result, employment in this sector declined dramatically.

The full extent of the decline cannot be measured using the two main Statistics Canada employment surveys: the Labour Force Survey (LFS) and the Survey of Employment, Payroll and Hours (SEPH). Each survey has a key weakness: the LFS cannot produce sufficiently detailed industry data, and SEPH excludes the self-employed—who make up about 1 in 10 ICT workers. However, it is possible to measure employment in the closely related computer and telecommunications (CT) sector. The CT sector is probably the core of what many Canadians consider the 'high-tech' sector. It includes the manufacture of computers, communication equipment, and semiconductors. It also includes companies that design and maintain computer systems, as well as telecommunications firms (see *The CT sector*).

The goal of this article is two-fold: first, to document the size of the decline in CT employment and hours worked in Canada and selected large urban centres according to the Labour Force Survey. This gives an idea of the CT sector's influence on overall employment in 2001. Second, on

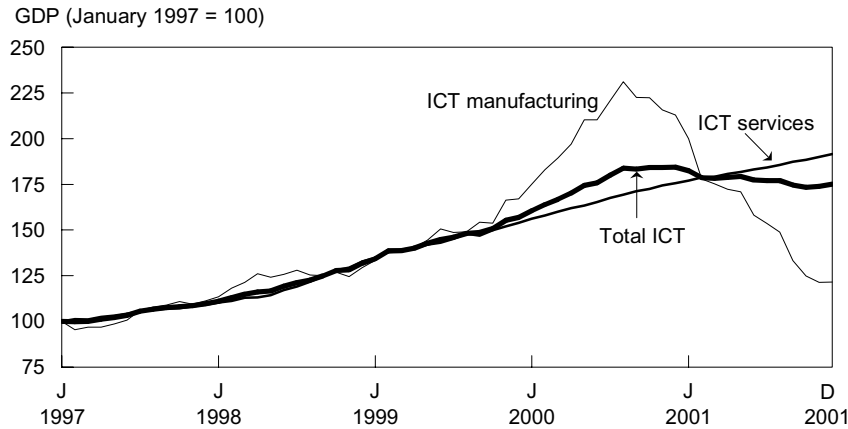
Chart A: The ICT sector has become increasingly important to the economy.



Source: National Accounts, gross domestic product, seasonally adjusted

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Chart B: Declines in manufacturing caused a drop in GDP within the ICT sector in 2001.



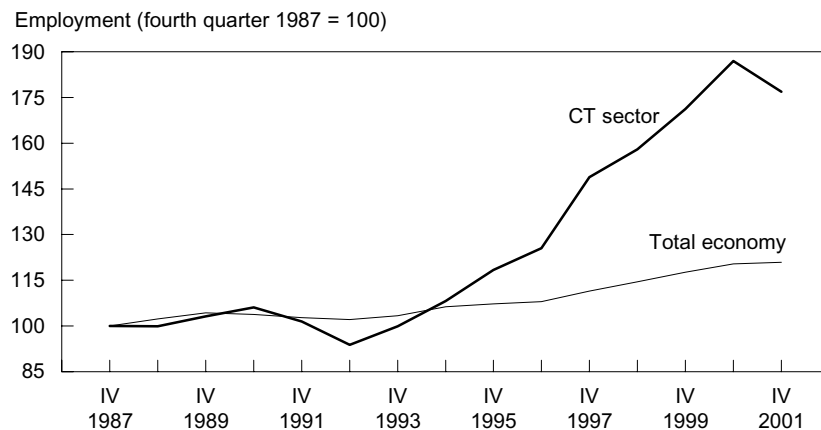
Source: National Accounts, gross domestic product, seasonally adjusted

a more technical note, the article introduces this new sector—a grouping of industries for which Statistics Canada has more data than it does for the standard ICT sector.

A heady period for Canada’s CT sector

The CT sector employs a lot of people—632,000 on average in 2001. These people worked some 23 million hours, accounting for 4.2% of employment and 4.6% of total hours worked. The majority of employment and hours was found in computer systems design and related services (about 40%) and telecommunications (around 25%).

Chart C: CT employment grew faster than overall employment.



Source: Labour Force Survey

Job growth was very strong, to say the least (Chart C). From the fourth quarter of 1996 to the fourth quarter of 2000, CT employment increased 211,000 (49%), and the number of hours worked in this sector grew by 8 million (51%). These rates of growth were three to four times greater than for the economy as a whole—11% for employment and 15% for the number of hours worked.

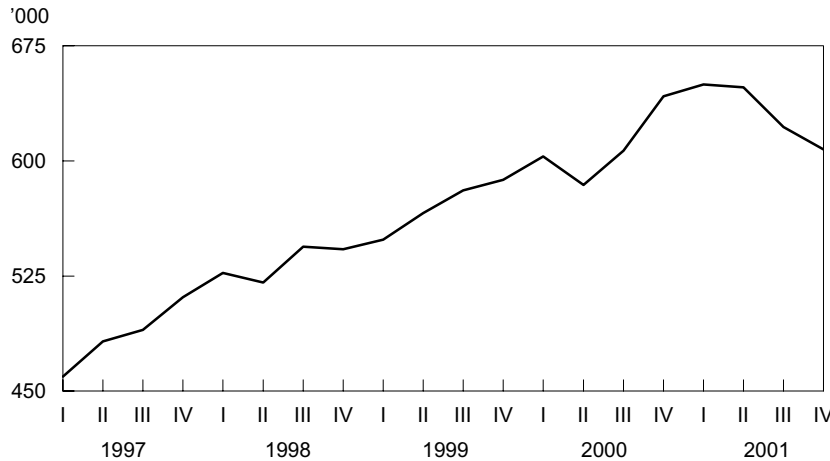
But the bubble has burst

Beginning in January 2001, employment growth slowed in a number of sectors of the economy. The CT sector was particularly hard hit (Chart D). From its peak in March to a trough in October 2001, employment tumbled 61,000 or 9%.¹ In communications equipment manufacturing, employment dropped 36% during this period.

Even though CT employment picked up somewhat in November, in the fourth quarter of 2001 it was still far less than a year earlier—down 5% to 608,000 (Table 1). Had it not been for a large drop in CT manufacturing employment (-23%), CT employment would have managed to show a small increase over 2001.

The boom and bust nature of the CT sector is not unique to the current economic slowdown. During the 1990-92 recession, the labour market contracted more sharply in the CT sector than in the economy as a whole. It appears that during economic expansion, employment, and hours worked in the CT sector increase more rapidly than in the total economy; conversely, during economic slowdown, they decrease more rapidly.

Chart D: CT employment tumbled after peaking in the first quarter of 2001.



Source: Labour Force Survey

CT employment swings were more pronounced

While CT employment fell 35,000 or 5.4%, the non-CT sectors of the economy registered a net gain of 101,000 jobs (0.7%) from the last quarter of 2000 to the same quarter a year later. Thus, even though the CT sector accounted for only a small proportion of total employment, it wiped out over a third of the net employment gains registered by other sectors.

The CT sector also saw its net number of hours worked decline by about 2.1 million (-8.6%) between the last quarters of 2000 and 2001. The non-CT parts of the economy saw a net loss of 12.9 million hours (-2.6%), leaving the

Table 1: Employment in the CT sector

	Fourth quarter average					
	1996	1997	1998	1999	2000	2001
	'000					
Employment						
CT manufacturing	108.7	135.5	113.3	149.0	168.7	129.4
CT services	322.5	375.8	429.2	438.9	473.4	478.1
CT total	431.2	511.3	542.4	587.9	642.1	607.5
Total economy	13,463.3	13,903.3	14,278.1	14,667.5	15,006.8	15,073.6
CT share (%)	3.2	3.7	3.8	4.0	4.3	4.0
	%					
Change from previous fourth quarter						
CT manufacturing	10.9	24.6	-16.4	31.6	13.2	-23.3
CT services	4.5	16.5	14.2	2.3	7.9	1.0
CT total	6.1	18.6	6.1	8.4	9.2	-5.4
Total economy	0.7	3.3	2.7	2.7	2.3	0.4
	'000					
Hours worked						
CT manufacturing	4,135.3	5,174.3	4,334.7	5,726.1	6,375.4	4,693.5
CT services	11,777.8	13,826.9	15,470.4	16,182.9	17,633.6	17,239.9
CT total	15,913.1	19,001.2	19,805.1	21,909.0	24,009.0	21,933.3
Total economy	452,940.1	471,504.3	482,266.2	498,463.2	518,922.0	503,914.0
CT share (%)	3.5	4.0	4.1	4.4	4.6	4.4
	%					
Change from previous fourth quarter						
CT manufacturing	7.9	25.1	-16.2	32.1	11.3	-26.4
CT services	4.8	17.4	11.9	4.6	9.0	-2.2
CT total	5.6	19.4	4.2	10.6	9.6	-8.6
Total economy	0.0	4.1	2.3	3.4	4.1	-2.9

Source: Labour Force Survey

total hours lost in the economy at 15 million or 2.9%. Even though less than 5% of all hours worked in the economy are in the CT sector, it was responsible for 14% of the decline in hours worked in 2001.

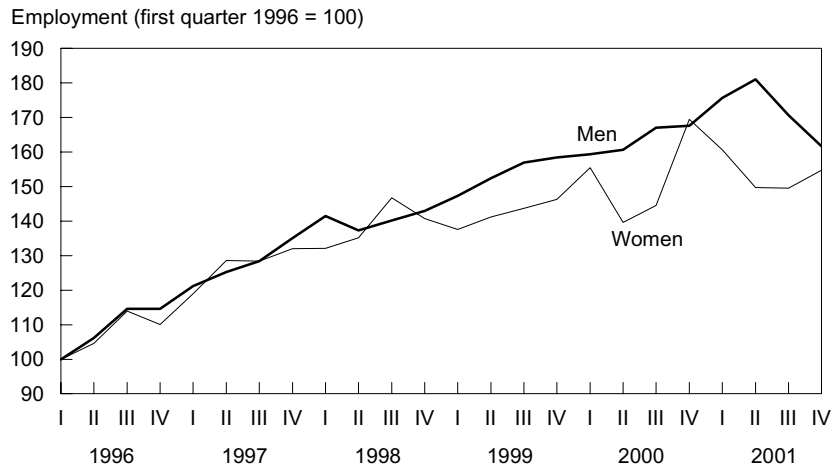
Workers affected by the drop in CT employment

Class of worker

During the CT boom of 1997 to 2000, employee growth (52%) was stronger than that of self-employment (28%). However, in 2001, the entire drop occurred among employees (down 42,000 or 7%). In fact, the number of self-employed CT workers rose (up 7,000 or 10%), driving their share from 12% in the last quarter of 2000 to 14% a year later. Almost all self-employment was in services—a rate of 17% in the last quarter of 2001, compared with only 2% in manufacturing (Table 2).

Despite the increase in 2001, the number of self-employed in the last quarter of 2001, at 82,000, was still 9% below the peak in the second quarter of 1999. In the first half of 1999, self-employment rose

Chart E: Over the last five years, CT employment growth has been stronger for men.



Source: Labour Force Survey

considerably, probably the result of firms engaging contract workers to correct Y2K problems.

Men versus women

In the last quarter of 2001, almost two-thirds of all CT workers were men, much higher than the proportion outside the CT sector (53%). Even so, in 2001 the

CT employment decline affected women (-20,000) more than men (-14,000) (Chart E).

Level of education

As one might expect, CT workers have more formal education than people working outside the sector. For example, at the end of 2001, about 36% of CT workers had a university degree, well above the 19% rate for other workers. During the 1997-2000 period, employers raced to hire highly qualified CT professionals, doubling the number of university-educated workers. However, in 2001, half the job losses in the CT sector were among workers with a university degree (Table 3).

Communities affected

The Labour Force Survey can also provide data on regional labour markets (although usually, the smaller the area studied, the smaller

Table 2: CT manufacturing and services employment

	Manufacturing			Services		
	Fourth quarter 2001	Change from fourth quarter 1996	Change from fourth quarter 2000	Fourth quarter 2001	Change from fourth quarter 1996	Change from fourth quarter 2000
Total	129.4	20.7	-39.3	478.1	155.5	4.6
Employees	126.4	20.1	-40.3	399.1	132.5	-1.7
Self-employed	3.0	0.6	1.0	79.0	23.1	6.3

Source: Labour Force Survey

The CT sector

Before determining trends in employment in the computer and telecommunications (CT) sector, it is important to define this industry grouping. CT is a sub-sector of the information and communication technology (ICT) sector and needs to be understood in this context.

The Science, Innovation and Electronic Information Division at Statistics Canada along with Industry Canada have developed a definition for the ICT sector for each of the industry classification systems used at Statistics Canada: the Standard Industry Classification (SIC) for 1980 (four-digit level) and the North American Industry Classification System (NAICS) for 1997 (five-digit level) (April, 1999). This work was based on a similar exercise conducted by the Organisation for Economic Co-operation and Development (OECD) in developing their own classification system (International Standard Industry Classification) (OECD, 2000). In general, the ICT sector is defined as the combination of manufacturing and service industries that electronically capture, transmit and display data and information (Statistics Canada, 2001).

However, many Statistics Canada surveys do not use the detail needed to define the ICT sector. In the case of the Labour Force Survey, industries are classified at the four-digit NAICS level.

One approach to measuring employment in the ICT sector using the LFS is to sum employment in all four-digit NAICS industries that include at least one five-digit NAICS ICT industry. Doing so includes many non-ICT industries. This would not be a problem if the industries were very small, but detailed industry data from the Survey of Employment, Payroll and Hours (SEPH) show that this approach leads to an unacceptable over-estimation of ICT employment. The same finding would likely be true of any Statistics Canada survey limited by the detail of its industry coding.

The conclusion, therefore, is that surveys that produce industry data only at the four-digit level cannot produce estimates for the ICT sector. They can, however, produce estimates for a core group of ICT industries termed

computer and telecommunications (CT). The CT sector can be seen as a sub-sector or 'core' component of ICT. In fact, according to SEPH, an estimated 88% of ICT employees work in the CT sub-sector—a percentage that has remained relatively unchanged since 1995.

The CT sector comprises 12 NAICS industries:

Manufacturing

- Commercial and service industry machinery (NAICS 3333)
- Computer and peripheral equipment (3341)
- Communications equipment (3342)
- Audio and video equipment (3343)
- Semiconductor and other electronic components (3344)
- Navigational, measuring, medical and control instruments (3345)

Services

- Computer and communications equipment and supplies wholesaler-distributors (4173)
- Software publishers (5112)
- Telecommunications (5133)
- Data processing (5142)
- Computer systems design and related services (5415)
- Electronic and precision equipment repair and maintenance (8112).

Not included in CT, but included in ICT, are the following:

- Communication and energy wire and cable manufacturing (33592)
- Office and store machinery and equipment wholesaler-distributors (41791)
- Cable and other program distribution (51322)
- Office machinery and equipment rental and leasing (53242)
- Other information services (51419)

The only NAICS industry included in CT that is not included in ICT is *Other communications equipment manufacturing* (33429).

Table 3: CT employment, by education

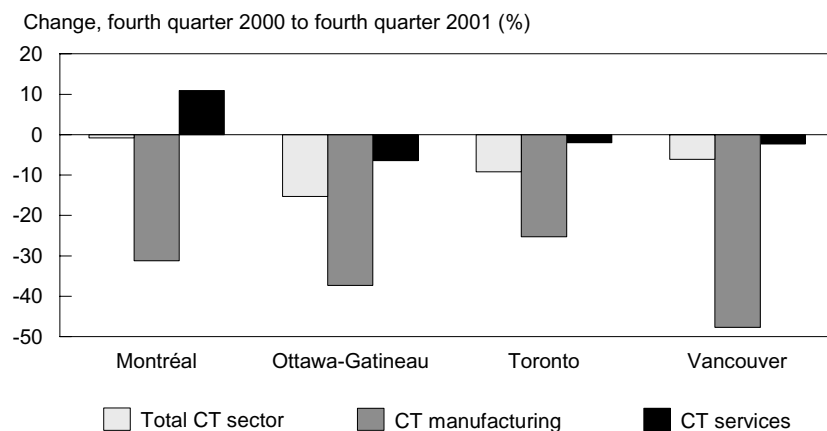
	Fourth quarter 2000	Change from fourth quarter 1996		Fourth quarter 2001	Change from fourth quarter 2000	
	'000	'000	%	'000	'000	%
Total	642.1	210.9	48.9	607.5	-34.6	-5.4
High school or less	125.4	23.6	23.2	123.2	-2.2	-1.8
Some postsecondary	61.5	11.8	23.8	55.1	-6.4	-10.4
Postsecondary, non-university	216.6	57.4	36.1	207.9	-8.7	-4.0
University degree	238.7	118.0	97.8	221.3	-17.3	-7.3

Source: Labour Force Survey

the sample size). Computer and telecommunications employment tends to be concentrated in large urban centres. In fact, about two-thirds of all CT workers are employed in Toronto, Montréal, Vancouver, and Ottawa-Gatineau—much higher than the share of total employment in these centres (39%).

Although similar in many regards, the CT workforces in these four key centres have some different

Chart F: In each of the four urban centres, CT manufacturing employment fell sharply in 2001.



Source: Labour Force Survey

characteristics. For example, Toronto has a relatively large computer and peripheral equipment manufacturing component, while Montréal and Ottawa-Gatineau are more specialized in communications equipment manufacturing. A relatively large proportion of Montréal's workforce is also employed in semiconductor manufacturing. Vancouver, meanwhile, tends to lean toward the services side with its important telecommunications and computer systems design industries.

With different CT sector composition as well as different economic conditions in the four centres, different CT employment trends in 2001 might also have been expected—but what *did* happen?

During the 1997-2000 boom, CT employment in the four centres rose 64%—remarkable growth for a four-year period. However, in 2001, conditions took a dramatic

turn for the worse (Chart F). In the fourth quarter, CT employment in Ottawa-Gatineau was down 10,000 (-15%) from a year earlier (Table 4). While not the only area of weakness, the communications equipment industry laid off numerous workers. Toronto had 17,000 fewer workers at the end of the year (-9%), while in Vancouver employment dropped 4,000 (-6%). In Montréal, the drop was less dramatic as gains in employment in CT

services largely offset declines in manufacturing. At the end of 2001, CT employment in Montréal was down 1,000 (-1%).

In Montréal and Ottawa-Gatineau, CT employment peaked sooner in the year, and also noted a recovery in the last quarter. In Montréal, the peak of 106,000 occurred in December 2000. By September, that number had dropped to 91,000 (-15%) but rose considerably in the last quarter. Ottawa-Gatineau reached its peak in March 2001 (69,000), and bottomed out in September (51,000 or -26% from the peak), recovering somewhat in the last quarter.

In both Toronto and Vancouver, CT employment peaked in the middle of 2001. In Toronto, the peak was attained in July, when there were 204,000 CT workers, a figure that dropped to 169,000 (-17% from the peak) at the end of the year. In Vancouver, CT employment hit 64,000 in August but slid to 58,000 by December (-8% from the peak). Unlike in Montréal and Ottawa-Gatineau, CT employment in Toronto and Vancouver showed no increase in the last quarter of 2001.

Table 4: CT employment in major urban centres

	Fourth quarter 2000	Change from fourth quarter 1996		Fourth quarter 2001	Change from fourth quarter 2000	
	'000	'000	%	'000	'000	%
Toronto	186.2	80.0	75.3	169.1	-17.1	-9.2
Montréal	106.3	32.8	44.6	105.4	-0.9	-0.8
Ottawa-Gatineau	67.5	28.4	72.6	57.2	-10.3	-15.3
Vancouver	62.1	23.9	62.6	58.3	-3.8	-6.1

Source: Labour Force Survey

Summary

Gross domestic product in the information and communication technology (ICT) sector declined rather dramatically at the end of 2001, especially in the manufacturing component. This led to layoffs and hiring freezes in ICT companies. While the full scale of the ICT decline is not directly measurable, total employment can be estimated in a core sub-sector of ICT: computer and telecommunications. This sub-sector experienced amazing job growth during the 1997-2000 period. However, CT employment fell dramatically in 2001, especially in its manufacturing industries. Some types of workers, such as women, employees, and university graduates, were more affected by this decline. Similarly, areas such as Ottawa-Gatineau and Toronto were hit harder by high-tech woes than most other urban areas in Canada.

■ Note

1 Although not seasonally adjusted, these CT data show little if any seasonal pattern. In other words, seasonally adjusting the overall CT employment series has little effect.

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Perspectives
