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STATISTICS and STATISTICAL METHODS: *Sex, Statistics and Wages*

EM9307: The Globe and Mail, Editorial, January 21, 1993, page A24

Sex, statistics and wages

GIVE the Canadian media some credit: they didn't make as much of a hash of this story as they usually do. The subject is the much ballyhooed "wage gap" between men and women, documented annually by Statistics Canada, and eagerly lapped up by the nation's newspapers and television news shows. Faint praise is in order this year, however, because three ingredients that are essential to understanding the wage difference – education, hours worked and marriage – received at least passing mention in some of last week's coverage.

It was reported that women's wages rose to 69.6 per cent of men's in 1991, from 67.6 per cent the year before. But what does that mean? For starters, it does *not* mean, despite the obfuscatory efforts of those who ought to know better, that women are being paid nearly one-third less to do the same jobs. A recent ad campaign by the Ontario Women's Directorate, for example, asked Toronto bus and subway passengers, "How much would they pay a man to do your job?" The slogan, and the text that followed, suggested to female readers that, by the simple virtue of being male, a man at their firm is being paid one-third more to do precisely the same job. He isn't. Sex discrimination in wages – paying a man with the same qualifications more than a woman to fill exactly the same position – is against the law, and has been ever since Bob Rae was in short pants.

Statscan's numbers are, of course, an average of millions of Canadians, with different ages, levels of and types of education, skills, years of work experience and jobs. An average focusing solely on gender tends to obscure the degree to which all sorts of other factors come into play. (Keep in mind also that the following statistics refer to full-time workers only.)

One would expect that, since society's attitudes towards women's work and education have changed relatively recently, the difference in average wages would be least among the young. And that is precisely what one finds: The hypothetical full-time working woman over age 55 earned 63.6 per cent of the income of her male counterpart in the same age bracket, while her grand-daughter, aged 15 to 24, earned on average 86.4 per cent as much as a man in the same age group.

Crunch the numbers a bit further, and other interesting facts pop up. Education, for one thing, matters. Women with a university degree earned more, not less, than men with lower levels of education. When one considers that a majority of those enrolled in Canadian universities are female (55.3 per cent of full- and part-time university students are women) it's hard to imagine a future in which the wage difference will not continue to narrow.

But there is already almost no wage gap between single men and single women. In 1991, the single women's average earnings were 91.1 per cent of those of their male counterparts. For some women, there was even less of a difference. Data compiled by Statistics Canada at *The Globe and Mail*'s request show that the income of single women aged 35 to 44 was 94.5 per cent of that earned by men of the same age. And looking only at the most educated members of that age group – single females with a university degree – women actually made six per cent *more* money than single, 35 to 44 year-old, university-educated men. (In fairness, the margin of error in Statscan's survey is large, so these last two percentages could be off by several points.)

All of these numbers refer, of course, to full-time workers. But not all full-time workers work the same number of hours. On average, men work more than women: 40.4 hours vs. 35.2 hours a week. In other words, the average man works 12.9 per cent longer, explaining a large part of the wage gap.

But the biggest factor is marriage. The earnings of single women, single men and married women working full-time are roughly comparable. But the earnings of the average married man rise above those of everyone else. That is the only real "wage gap." Whether or not it is a problem is a subject worthy of discussion. Its existence suggests that, as one would expect, married men and women choose certain career and life paths, different from those chosen by singles. But why is it that many married women work only part-time, or adopt less time-consuming (and less well-paying) full-time careers? Are they forced to by their husbands? By circumstance? By entrenched social attitudes? Do many, for a hole variety of unquantifiable reasons, freely choose this path, thinking it best for their families?

In the debate that ought to take place around this issue, answering these questions would be a good place to start.

1 At the end of the first paragraph of the editorial EM9307 reprinted above, education, hours worked and marriage are referred to as *three ingredients that are essential to understanding the (male-female) wage difference*. Outline the essential *statistical* issue(s) raised by this statement.
- Summarize how the editorial uses information on each of these three explanatory variates to reduce the limitation imposed on Answers to Questions about the response variate (male-female difference in wages).
  - Indicate how the limitation on Answers would be affected if each explanatory variate were to be ignored.

2 At the end of the second paragraph of the right-hand column of the editorial EM9307 reprinted above, the (large) *margin of error in Statscan's survey* is mentioned. Describe briefly what you understand to be the matter(s) of statistical importance implied by this phrase in the context of the editorial.
- Indicate briefly how to reconcile your answer with the phrase from the beginning of the third paragraph of the editorial; *Statscan's numbers are ..... an average of millions of Canadians, ...*

3 Comment briefly on the figure of *12.9 per cent* given near the end of the third paragraph of the right-hand column above.
- Explain briefly whether it would be correct to say 12.9 *percentage points* in this context instead of 12.9 per cent.

4 The last sentence of the second-last paragraph of the editorial EM9307 is the question: *Do many (married women), for a whole variety of unquantifiable reasons, freely choose this path, thinking it best for their families?* Explain briefly what you consider to be the *statistical* issue(s) raised by the word *unquantifiable* in this context.

(*continued overleaf*)

EM9028: The Globe and Mail, March 10, 1990, page A13

Women's occupations still lowest-paying, Statscan study says

BY VIVIAN SMITH
The Globe and Mail

More Canadian women that ever are tapping out the nation's letters, keeping its books and standing behind its check-out counters, Statistics Canada reports.

In a report released yesterday called *Women and the Labour Force*, Statscan reported that despite small gains in the number of women managers, most women over the age of 15 are concentrated in a few occupations that are generally low-paying and have little room for advancement.

It also showed a huge jump in the number of married women with pre-schoolers at home who have joined the work force: their numbers went from 36.5 per cent in 1976 to 62.1 per cent 10 years later.

"In addition to their work in the labour force, married women continue to be responsible for child care and household work," said the report's authors, Patricia Connelly and Martha MacDonald of St. Mary's University in Halifax.

And over a 15-year period, from 1970 to 1985, the average earnings of women crawled up to just 66 per cent of what men were paid from 60 per cent.

Women also had a higher unemployment rate than men in 1986 and did two-thirds of all part-time work.

"This just confirms what we've found in our own report," said Alice de Wolff, executive co-ordinator of the National Action Committee on the Status of Women.

She was referring to a parallel study the NAC has prepared that paints a less rosy picture of Canadian women's lives than did a recent federal government submission to the United Nations.

"In terms of the wage gap, the government's attempt at employment-equity laws has not shifted the trends. Not only is the concentration of traditional work increasing, but the terms are deteriorating," Ms. de Wolff said.

She cited low wages, a lack of benefits and job security for part-timers and what she called "a killing need" for more day-care spaces. "Our report shows that the proportion of child-card spaces has not increased since 1977," she said.

According to the Statscan report, which takes its data from the 1986 census, more than half of all Canadian women (55.4 per cent) were employed or looking for work in 1986, an increase from 39.9 per cent in 1971 and only 24.1 per cent in 1951. Most of these women were married.

Between 1971 and 1986, the number of men in the labour force was fairly stable at about 77 per cent, so that by 1986 5.6 million women and 7.5 million men were employed or job-hunting.

While women made up 42.6 per cent of the employed work force in 1986, they made up 61.1 per cent of that force in community, business and personal service industries.

In 1971, the report said, 55 per cent of women working outside the home were in clerical, sales and service jobs, compared with 58.1 per cent in 1986. These three areas had the largest gains in numbers of women workers over the 15-year period, reflecting an expansion of the service sector and women's dominance in clerical work.

In both 1971 and 1986, the top three occupations for women were secretary, bookkeeper and salesperson.

In the managerial category, women's share of jobs doubled from 15.4 per cent in 1971 to 31.5 per cent, or 249,270 women.

This is a large gain, but only in three areas: finance, insurance and real estate; community, business and personal services; and agriculture.

Men made some inroads into female-dominated occupations during the time studied. More men became nurses, dancers, telephone operators, elementary school teachers, cashiers, tellers and waiters.

Where women made some advances in non-traditional areas such as mining and fishing, it was usually still in clerical positions in those industries.

Technology has played a part in some job changes. Eighteen occupations showed a decrease in the number of women participating, but many of those were declining occupations themselves, such as typist and clerk-typist.

The report's authors showed that in jobs where women's numbers increased the most, income was low. For instance, in the services category, women received an average of $13,418 in 1985 while men in the same job group were paid an average of $24,151.

In the managerial sector, however, a typical woman made $27,014, compared with $45,170 for a man.

Finally, the report said, women do not work for pin money. "There are indications that most women are working to support themselves and others," the authors wrote. Nearly 40 per cent of women in the labour force are single, and of those 18.5 per cent are single parents.

Of those with a husband or partner present, one-third had a mate whose total income was less than $20,000 a year. Sixty per cent had a partner whose income was less than $30,000 in 1985.

1 What do you infer, from the article EM9028 reprinted above, was the *principal* Question the Statscan report was intended to answer? Explain briefly.

2 What is the most common type of population *attribute* mentioned in the article EM9028 reprinted above?
- Is the corresponding *variate* continuous or discrete? Explain briefly.

3 List the values quoted for *measures of location* that are given in the article EM9028 reprinted above; identify the paragraph from which you take each value.
- What Question(s), if any, does each value answer?
  - As well as measures of location, what *other* information is desirable? Briefly explain why this information would be useful.

4 There was an appreciable *delay* between the collection of the census data (April, 1986) and the publication of the report (March, 1990); suggest reason(s) for this delay.

5 In the third paragraph of the middle column, the article EM9028 reprinted above mentions that the Statscan report was based

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5 on data from the 1986 *census.* As a basis for answering Questions, what are the advantages of census data:
- in theory;
- in practice?

Explain briefly in each case, with particular emphasis on the *difference(s)* between theory and practice.

6 In the final paragraphs of the article EM9028, several average income figures are quoted. What factor(s) might impose limitations on these values as Answers?
- Would the factor(s) you identify be more likely to make the averages quoted *too high* or *too low*? Explain briefly.

The articles EM9028 and EM9307 reprinted on page HL99.1 and the facing page HL99.2 are used in Figure 4.3 of the STAT 220 Course Materials; EM9307 is also used in Chapter 1 of the STAT 231 Course Materials.